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DEVELOPMENT OF CORE PHARMACY ROLES WITH
COMPETENCY/EPA ALIGNMENT AND LEVELS OF ENTRUSTMENT

By

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A Dissertation Submitted to the Faculty of the College Education and Human
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ABSTRACT

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Kimberly K. Daugherty

October 6, 2020

The purpose of this two-phase embedded mixed-method project was to investigate the extent to which a consensus exists among pharmacy professionals regarding core practice-ready roles for graduates that align with current pharmacy competencies/EPA statements with entrustment levels. Current competencies/EPAs were perceived as mapping to the core roles developed during this study, with some missing competencies. Some of the EPA levels of entrustment varied depending on the role to which it was mapped. Some levels were different than the current recommended EPA entrustment level recommended to be used by schools/colleges. The development of a set of core roles with the mapping of pharmacy competencies and EPAs is the first step in pharmacy developing an education model like medicine.

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CHAPTER 1: INTRODUCTION

A critical issue in pharmacy education is the production of practice-ready entry-level graduates equipped to engage in 21st-century healthcare (Frenck et al., 2010). Vogenberg and Santilli (2018) identified themes describing the current healthcare trends driving the US healthcare system. These themes include the use of technology (e.g., telehealth, telemedicine), as well as changes in (a) healthcare insurance, (b) workforce, (c) healthcare cost, (d) drug supply chains, and, lastly, (e) government and regulatory changes (e.g., Affordable Healthcare Act). Just as the healthcare world has changed, so has the definition of a practice-ready pharmacy graduate. As of today, a practice-ready entry-level graduate is a pharmacist that is not only prepared for current practice but also has life-long learning skills (Wolff, Pesut, & Regan, 2010). These themes and changing definition of practice-readiness require schools/colleges of pharmacy to prepare practice-ready entry-level graduates for pharmacy's place in this shifting healthcare world (Barnett, 2000b). To prepare practice-ready graduates, schools/colleges of pharmacy need to know the core roles students need to execute upon graduation. Competency statements and entrustable professional activities (EPAs), mapped to these core roles, could then be used to create the pedagogies and assessments to prepare practice-ready graduates.

Due to continuous healthcare changes, shortages in primary care physicians, and the aging population, the role of the pharmacist is in the transition from a product-centered focus (just dispensing medication as prescribed) to a now patient-centered focus (Frenck et al., 2010; Isasi & Krofah, 2015). This shift to a patient-centered focus means

pharmacists are no longer working in a silo to dispense medications. Instead, they serve as an integral part of the healthcare team initiating and modifying drug therapies, reviewing patient medication problems to identify issues, performing lab tests, and collaborating with other healthcare providers. Adding a pharmacist to a healthcare team can improve healthcare outcomes and decrease costs (Isasi & Krofah, 2015). For example, one retrospective analysis conducted in North Carolina community pharmacies found that medication therapy management (MTM) services (e.g., patient assessments, creating medication treatment plans) improved outcomes and reduced costs (\$9444 annual cost savings; Michaels, Jenkins, Pruss, Heidrick, & Ferreri, 2010). Pharmacy education needs to continue to adapt to better prepare students to be practice-ready for the new and uncertain roles occurring with this transition to a patient-centered focus. Establishing a set of core practice-ready roles may help ensure that all schools/colleges of pharmacy produce graduates with minimal knowledge, skills, and attitudes to allow the graduate to be successful as a practitioner.

With this new patient-centered focus, practice-ready entry-level pharmacy graduates will need to mobilize knowledge, think critically to modify drug therapies, and collaborate with other healthcare providers on both local and global teams (e.g., conducting medication therapy management services; Frenk et al., 2010; Leadbeatter & Peck, 2017). Graduates also need soft skills such as ethics, concern for others, and engaging perspectives different from their own (e.g., working with physicians to modify patients' chronic medications; Frenk et al., 2010; Leadbeatter & Peck, 2017). Pharmacists need these skills to provide more intensive patient care, such as health improvement/wellness counseling, disease-prevention services, and even primary care

services (Isasi & Krofah, 2015). The job of schools/colleges of pharmacy is to ensure that all students meet these skills by being professionally competent. The definition of professional competence is “the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community served” (Epsetin & Hundert, 2002, p. 226). To aid pharmacy programs in creating pedagogies and assessments that ensure minimum professional competence, the concepts discussed in the professional competency definition need to be included not just in the outcomes but also in the roles pharmacy graduates prepare to perform. The current lack of defined roles leads schools/colleges to define these practice-ready roles based on their interpretations of the existing pharmacy competencies, leading to students being prepared differently for practice.

Pharmacy Accreditation Standards 2016 adopted the CAPE (Center for the Advancement of Pharmacy Education) 2013 (Medina et al., 2013) outcomes as the competencies that all schools/colleges of pharmacy need to teach and assess (Accreditation Council for Pharmacy Education [ACPE], 2015). CAPE 2013 is the fourth version of educational outcomes created to guide curricular and assessment discussions within schools/colleges of pharmacy (Medina et al., 2013). Pharmacy chose a different competency development path from other professional programs such as medicine. Medicine developed its competencies after developing a set of broad abilities (roles) that physicians should acquire at graduation and continue to grow throughout their career to meet the healthcare needs of their patients (Accreditation Council for Graduate Medical Education [ACGME], 2017; Frank, Snell, & Sherbion, 2015; General Medical Council,

2017). Pharmacy chose to update the 2004 version of the CAPE outcomes (previous versions in 1992 and 1998) through a pharmacy and other healthcare literature review instead of defining roles first (Medina et al., 2013). The final CAPE outcomes center on four large domains that subdivide into 15 specific subdomains (Appendix A). The four broad domains include Foundational Knowledge, Essentials for Practice and Care, Approach to Practice and Care, and Personal and Professional Development (Medina et al., 2013). While the CAPE outcomes divide into four broad domains, these domains are student learning outcomes instead of roles that student pharmacists should prepare for upon graduation. Schools/colleges of pharmacy are also not provided a framework for pedagogy and assessment of the CAPE outcomes, which leaves it up to the school/college how they want to implement these outcomes to meet the accreditation standards. The pharmacy accreditation standards only require that schools/colleges maintain a specific pass rate on the pharmacy licensure exam [North American Pharmacy Licensure Exam (NAPLEX)], which is a knowledge-based exam as opposed to holding schools/colleges to specific assessment standards related to the CAPE outcomes (ACPE, 2015), which is why each school can set their outcome attainment level.

One way that schools/colleges might show achievement of the CAPE outcomes is by using EPAs (Appendix B) developed by the AACP (American Association of Colleges of Pharmacy) Academic Affairs Standing Committee (Jarrett, Berenbrok, Goliak, Meyer, & Shaughnessy, 2018). EPAs are considered “units” of professional practice designed to be independent, executable, observable, and measurable activities to aid in assessing professional competency by translating competencies into clinical practice (ten Cate, 2013). Usage of the 15 pharmacy EPAs occurs in a variety of ways in schools/colleges of

pharmacy. Some schools/colleges use the EPAs to assess students' progression throughout the curriculum by defining different EPA entrustment levels based on a student's professional year in the curriculum. Other schools/colleges use the EPAs to assess students during only the curriculum's experiential portions to tie the didactic competencies with the professional activities seen in the clinical setting (Jarrett et al., 2018). This lack of standardization allows schools/colleges to define their level of entrustment required for graduation.

Assessment of EPAs occurs using entrustment levels, which students should complete, like climbing rungs of a ladder (Modi, Gupta, & Singh, 2015). Level 1 entrustment suggests a student can observe but not complete a task (e.g., a student may observe but not do a patient's medication history). Level 2 is execution with direct and proactive supervision (e.g., student will perform the medication history with the pharmacist in the room providing advice). Level 3 is performance with quickly available (reactive) supervision (e.g., the student will perform the medication history alone with the pharmacist in the next room should help be needed). Level 4 is execution with supervision from a distance or when asked for by the student (e.g., a student can be freely trusted to perform the history without any help). Level 5 is the ability to teach someone else the skill (ten Cate, 2013). The AACP Academic Affairs Standing Committee recommends pharmacy graduates achieve a Level 3 (reactive supervision) on each of the 15 core EPAs upon graduation (Jarrett et al., 2018). Accreditation does not require a specific entrustment level, so schools/colleges are free to define their own, making it hard to compare student EPA achievement across programs.

The lack of consistency on use and understanding of the pharmacy EPAs across schools/colleges is seen in three studies (Moon, Lounsbery, Schweiss, & Pittenger, 2018; Pittenger, Gleason, Haines, Neely, & Medina, 2019; VanLangen, Meny, Bright, & Seiferlin, 2019). The first study by Moon et al. (2018) surveyed all pharmacy residency program preceptors and residents using a Likert scale and free text at the University of Minnesota. Moon et al. asked the preceptors and resident pharmacists to describe their perceptions of using the EPAs to assess performance. Results showed that 66.7% of residents and 78.3% of preceptors thought the EPA framework was more helpful than the previously used assessment model for all but three EPAs (leadership skills, developmental planning, and practice management skills). Resident pharmacists achieved an entrustment level of 4 or 5 upon completion of the program. Research needs to be done on the EPAs related to leadership skills, developmental planning, and practice management skills to determine why both resident pharmacists and preceptors found them hard to assess as well as on the level of entrustment that residents should achieve. Suppose resident pharmacists should be achieving a 4 or 5 upon completion of the residency year. In that case, it should make sense that student pharmacists should be performing at an entrustment level of less than that upon graduation. However, literature related to student entrustment level attainment does not seem to support this idea, making it hard to use EPAs to assess graduate practice-readiness (Moon et al., 2018).

VanLangen et al. (2019) sought to examine faculty feelings on the importance of the current EPAs and the expected entrustment level. Faculty at one school of pharmacy were surveyed using a Likert scale to quantify the importance of the current EPAs and the anticipated level of entrustment for each EPA. VanLangen et al. found a strong

consensus ($\geq 75\%$ agreement) of importance for 13 out of the 15 EPAs. Two of the EPAs only had a moderate consensus (50-74.9% agreement): appropriate use of medication in a population and identifying risk for prevalent diseases in a population. Faculty also could not come to a consensus on the appropriate level of entrustment. Only 10 of the 15 EPAs had a moderate consensus of a level three entrustment recommended by AACP. The others had rates that spanned across all the entrustment levels (VanLangen et al., 2019). VanLangen et al. is the first published article that has reviewed faculty perceptions of what level of entrustment students should achieve on the EPAs outside of the recommendation made by the standing committee at the time of EPA development. Further research and consensus-building need to occur around the minimum entrustment level that students should achieve before graduation. Without a minimum level of entrustment that all schools/colleges should have students achieve, it leaves it up to each school/college to define it for themselves. This lack of required level of entrustment makes it hard for schools/colleges of pharmacy to explain to students how the EPAs will prepare them for practice.

Pittenger et al. (2019) studied a student's understanding of how the EPAs and levels of entrustment fit into practice. Pittenger et al. surveyed student pharmacists to determine if students across multiple programs felt the 15 EPAs were relevant to pharmacy practice and if practice settings used the EPAs. Greater than 94% of students perceived relevance for 14 out of the 15 EPAs in practice, with the lowest agreement occurring on the EPA for continuous professional development (85% agreement). Greater than 91% of students felt that nine out of the 15 EPA statements represented activities performed in multiple practice settings. With the lowest level of agreement again on

continuous professional development (67% agreement). Another one of the lower levels of agreement was for the EPA to identify risk for prevalent diseases in a population (72% agreement), which was also seen as a problem by faculty in VanLangen et al. (2019). These results indicated that students do understand the usage of activities assessed with the EPAs in pharmacy practice. However, they see less need for the EPA around continuous professional development, which is an essential skill in this new healthcare environment as outlined in the professional oath of a pharmacist that students take upon graduation (American Pharmacists Association, 2020).

Pittenger et al. (2019) also asked students to rate their level of entrustment on the EPAs as they moved through the pharmacy curriculum as well as areas they felt least prepared to do upon graduation. Students did report feeling they required less supervision in performing the EPAs as they progressed throughout the program with a median entrustment level of 2 for 13 out of the 15 EPAs for first-year students and median entrustment level of 3 for 10 out of the EPAs in the second year students. Third-year students indicated an equal split on the EPAs between entrustment levels 3 and 4. Before graduation, fourth-year students showed a median entrustment level of a 4 on 13 out of the 15 EPAs. Students felt the least prepared for EPAs involving overseeing pharmacy operations (57% felt prepared), developing plans for continuous professional development (42% felt prepared), and establishing patient-centered goals and care plans (32% felt prepared; Pittenger et al., 2019). The Pittenger et al. study shows gaps in understanding how the current EPAs assess the skills needed for practice (i.e., continuous professional development, establishing patient care plans, and overseeing pharmacy operations). Without a set of core pharmacy roles on which to map the competencies and

EPAs, it is hard to help students understand the big picture of how EPAs assessments will determine they are ready for practice upon graduation and what level of entrustment they should be obtaining.

Other healthcare professions have created a core set of roles for their professions to define the abilities needed to care effectively for patients upon graduation and throughout a professional's career. These core roles help students understand how pedagogies and assessments used by the school/college determine practice-readiness. For example, the three large medical education groups, CanMeds (Frank et al., 2015), ACGME (Accreditation Council for Graduate Medicine Education; ACGME, 2017), and the General Medical Council (General Medical Council, 2017), have all created similar sets of roles that describe the broad abilities physicians should acquire upon graduation. These roles are the same regardless of the medical discipline or stage of professional development. Specific competency statements and EPAs map then to each of these roles. The competency statements and EPAs are discipline-specific (i.e., internal medicine would have different competencies/EPAs compared to pediatrics), but all map back to the broad roles. Levels of entrustment a student/professional should be achieving for a stage of their career is then assigned (i.e., a medical student may be a level 3 for a competency while a practitioner who just graduated residency is a level 4). This level of mapping of competency/EPAs back to a broad set of roles is missing in pharmacy education, making it hard to determine if all students have the minimal skills necessary to practice regardless of the pharmacy discipline.

The medical competency statements and EPAs mapped to core roles aid in the pedagogy and assessment of medical students (ACGME, 2017; Frank et al., 2015, &

General Medical Council, 2017). For example, one of the competencies mapped to the CanMeds Medical Expert role is: “Practice medicine within their defined scope of practice and expertise” (Frank, Snell, & Sherbion, 2014, p. 1). This competency indicates schools of medicine need to have pedagogies that discuss the knowledge and skills required for a physician’s scope of practice. An example EPA for this competency would be “Gather a history and perform a physical examination” (Englander et al., 2016, p. 1354). Assessment of student performance on EPAs occurs using the entrustment levels described earlier with the goal entrustment level based on the stage of the student’s career (i.e., lower for medical students, higher for residents). Students are said to have met the competencies mapped to the specific EPA if they achieve the desired EPA level for the particular stage in their training (ten Cate, 2013). This alignment of roles to competency statements to EPAs shows a clear connection between the pedagogy and assessment used in colleges of medicine and the roles students will be required to participate in upon graduation. Pharmacy has not created a clear connection between the competencies and EPAs used for pedagogy and assessment and the roles students should be prepared for upon graduation, leaving it up to schools/colleges to determine the roles. This lack of consistency across programs results in schools/colleges designing pedagogies and assessments based on the program’s interpretation of the competencies, making it hard to compare pedagogies and assessments across schools/colleges. It also makes it hard for stakeholders to know what students should minimally be prepared for upon graduation, as everyone is potentially prepared differently depending on where they graduate.

A range of academic, industry, and other stakeholders have discussed the competencies and entrustable activities that pharmacists should be able to do upon

graduation (Alston, Marsh, Castleberry, Kelley, & Boyce, 2017; American College of Clinical Pharmacy, 2014; Augustine et al., 2018; Chanakit, Low, Wongpoowarak, Moolasaran, & Anderson, 2015; Greinter & Knebel, 2003; Hester et al., 2014; Kennie-Kaulback et al., 2012; McLaughlin et al., 2017; O'Sullivan, Sy, & Bacci, 2017; Saseen et al., 2017; Thompson, Nuffer, & Brown, 2012; Vlasses et al., 2013). Employers and student graduates agree students need to have the skills mentioned in the current CAPE outcomes (Alston et al., 2017; Kennie-Kaulback et al., 2012; Thompson et al., 2012). However, both employers and student graduates point towards the need for more skills in other areas (Chanakit et al., 2015; McLaughlin et al., 2017; Noble et al., 2014; Vlasses et al., 2013. Waite et al., 2018). Employers feel graduates need more development in human resource skills, including conflict resolution, management/leadership, and the regulatory aspects of pharmacy as well as in imagination, adaptability, and agility (Chanakit et al., 2015; McLaughlin et al., 2017; Vlasses et al., 2013). The limited data from recent graduates find that graduates would recommend more emphasis on professional identity formation and how to handle performing services for patients in busy pharmacy practice situations (Noble et al., 2014; Waite et al., 2018). Employers and student graduates' data point to potential gaps in student training based on the current competencies. These gaps may be due to a lack of core roles that define what students should do upon graduation.

Pharmacy organizations also agree the skills within the CAPE outcomes are needed. However, pharmacy organizations feel additional systems-based and population health-based outcomes such as practice-management, identifying systems-based errors, resolving medication-related problems, and improving transitions of care need to be added for practice (American College of Clinical Pharmacy, 2014; Hester et al., 2014;

Saseen et al., 2017). Discussions with stakeholders demonstrate that despite having a set of competency statements (CAPE outcomes), there are still some gaps for which graduates are not prepared.

The other thing that makes it appear to stakeholders there are gaps in graduate preparedness is the differences in state laws required for licensure. Some states require students only to pass the NAPLEX and a law examination while others require students also to pass other competencies such as non-sterile compounding or sterile compounding (NABP, 2020). Confusion also occurs due to the extra credentials that pharmacists can achieve both before and after graduation. Credentials like additional master's degrees and medication management certificates can be received before graduation, while others like residency training and Board Certification have to wait until after graduation (Salahudeen and Nishtala, 2015). The lack of defined core roles upon graduation leads stakeholders to determine skill students should have upon graduation for themselves, which may explain some of the gaps discussed in the literature.

To aid healthcare professions in developing competencies for their curricula regardless of the profession, Englander et al. (2013) developed a competency template. The purpose of the competency template is to provide a common taxonomy for competency domains to ensure that all healthcare professions prepare students to practice in an ever-changing healthcare world. After reviewing 153 competency lists from across all healthcare professional education, the competency template was put together, including nursing, pharmacy, chiropractic, optometry, public health, physician assistants, dentistry, and veterinary medicine. The eight competency domains included in the final competency template were patient care, knowledge for practice, practice-based learning

and improvement, interpersonal and communication skills, professionalism, systems-based practice, interprofessional collaboration, and personal and professional development (Englander et al., 2013). Comparing the pharmacy competencies to the Englander list shows about 80% of the competencies are within the CAPE 2013 outcomes just under different competency headings (Englander et al., 2013). Missing areas in the pharmacy competencies include systems-based practice, transitions of care, and providing role modeling as well as specifics related to handling difficult conversations, uncertain situations, conflict management, and stress management. These missing areas may be due to a lack of mapping to a core set of roles that pharmacists should be prepared for upon graduation, as many of these missing areas are mentioned in the pharmacy stakeholder literature.

Aligning the pharmacy competencies with those on the health professional competency template by Englander et al. (2013) may help ensure a common language between pharmacy and other health professions. This common language will help develop interprofessional education opportunities because all professionals will teach and assess common competencies. This common language will also help demonstrate where pharmacy fits into the broader healthcare system, which will be important as the profession continues to advocate for increasing roles on the healthcare team (Englander et al., 2013). Aligning pharmacy competencies with those of other health professionals, like medicine, may also help pharmacy transition to competency-based education seen in medicine.

One of the biggest benefits of competency-based education is ensuring all students have the same baseline level of skills upon graduation due to the definition of

consistent competencies and milestones that all students would need to meet. The move to full competency-based education would also provide schools with a minimum set of acceptable levels of performance for all competencies, thus leading to all students having the same minimum level of skills upon graduation. Lastly, competency-based education allows students to achieve competencies at their own pace instead of relying solely on the passage of time (i.e., just because you move from one professional year to another because you passed all courses does not mean you meet all competencies). However, pharmacy is far from moving to full competency-based education due to multiple factors. One factor is assigning experiential rotations when current state laws dictate a maximum level of students per preceptor. Schools may not have enough preceptors available with the move to competency-based education, depending on how fast or slow students are moving through the curriculum.

Another problem is how to handle faculty workload and assessments when the number of students is not consistent moving through the curriculum and how to handle lock-step curricula that require students to move from one course to another in a specific order. Lastly, opponents of competency-based education fear that this move would mean more emphasis on skills and less on the knowledge. This move could be a problem in a content-heavy profession like pharmacy, thus moving pharmacists back to the product-centered role as oppose to the patient-centered role (Medina, 2017).

Defining core roles from which pharmacy could derive competency and EPA statements needed for pedagogy and assessment is one way to help with this move to competency-based education. It will be important when defining the core roles for pharmacy graduates to consider the knowledge and skills needed for current practice and

the role of life-long learning, which will be necessary for a pharmacist to succeed in this ever-changing healthcare world (Leadbeatter & Peck, 2017). In healthcare, research telling pharmacists what influences patients' health conditions continuously updates, and a pharmacist needs to keep up with this new information and integrate it into their practice throughout their career (Leadbeatter & Peck, 2017). This example makes it essential to ensure pedagogy and assessments used by schools/colleges of pharmacy prepare students for the ability not just to regurgitate knowledge and skills that they have learned but enable students to apply knowledge and skill domains in new and different ways due to continuously changing practice (Barnett, 2000b). It is essential students and faculty understand how the competencies and EPAs used to derive program pedagogy and assessment link to core roles that students should prepare to execute upon graduation. This linkage will help schools/colleges of pharmacy better prepare students for the changing healthcare world.

Theory For Role Development

The theory of “learning in a supercomplex world” (Barnett, 2000a) represents an educational theory to use to define core pharmacy roles and the alignment of the competency/EPA statements (Leadbeatter & Peck, 2017). This theory stems from the undergraduate higher education literature and seeks to explain how learning changes based on how society perceives the world: complex or supercomplex (Barnett, 2000a). A complex world is one where handling of facts, data, evidence, tasks, and arguments occur within a framework known by the person (Barnett, 2000a). The complexity arises when demands exceed the resources needed to meet them, which leads to an overload of data (Barnett, 2000b). For example, in a complex pharmacy world, patients' disease states were treated without regard to a patient's social or cultural traits, so a pharmacist only

had to think within their professional knowledge scope to diagnose and treat a patient (Leadbeatter & Peck, 2017). For student pharmacists, this meant that they only had to fill the prescribed medications and only had to know information about the drug itself. The complex world (product-centered focus) did not require the student to learn to work with other healthcare disciplines nor to think much about the patient's social or cultural situation before providing treatment.

In contrast, in a supercomplex world (patient-centered focus), problems are not as identifiable. This lack of problem identification is because, in a supercomplex world, knowledge and skills are continually changing (Barnett, 2000a, 2000b). For example, research telling pharmacists what influences different health conditions in patients continuously updates, and a pharmacist needs to keep up with this new information and integrate it into their practice (Leadbeatter & Peck, 2017). The ability to keep up with and incorporate further knowledge into practice takes a different teaching and assessment type to prepare students to learn in this type of ever-changing world. Student pharmacists now must work in interprofessional teams, learn new information continuously, and apply old data in new ways. The knowledge/skills that one develops in school will become irrelevant over time, which requires continuous learning skills (Barnett, 2000b; Bengtsen, 2017). Continuous learning skills are an area that needs better emphasized to students as, according to the study by Pittenger et al. (2019), students felt the least prepared for continuous learning and did not see this EPA as relevant to pharmacy practice.

To help students learn to function in a supercomplex world, pharmacy roles need to take on three components: knowing, action/skills, and self-identity/attitude (Barnett,

2000a; Bengtsen, 2017). While the current CAPE Outcomes (Appendix A) contain knowledge (Domain 1), skills (Domains 2 and 3), and attitudes (Domain 4; ACPE, 2015), the problem becomes that many times, the concepts are looked at in silos as opposed to teaching and assessing things holistically. The other problem is that because pharmacist's roles upon graduation have not been precisely defined, schools/colleges are left to determine the knowledge, skills, and attitudes that students should be taught and assessed for themselves as long as they align with the current pharmacy outcomes.

Pharmacy created competencies and EPAs to mirror medicine to help define and assess the knowledge, skills, and attitudes needed by students upon graduation (Englander et al., 2016). While the CAPE Outcomes are required to be used by schools/colleges for accreditation, EPAs are not. EPAs also do not have an accreditation required defined level of entrustment, allowing programs to set this for themselves. This lack of standardization means that students may be prepared differently for practice depending on where they graduate and may lead to graduates not being as prepared for safe and effective practice as seen in other professions (Frank, Snell, Englander, & Holmboe, 2017; Josiah Macy Jr. Foundation, 2017). Having a defined set of pharmacy roles with competency and EPA mapping and a set level of entrustment based on progression through a professional's career may be one way to help ensure minimal preparation for all graduates. The purpose of this project is to investigate the extent to which a consensus exists, if any, among pharmacy professionals regarding core practice-ready roles for graduates that then align to current pharmacy competencies and EPA statements, with levels of entrustment. The creation of a core set of roles with competencies/EPAs that align with them and a standardized level of EPA entrustment

would help ensure consistency of student knowledge, skills, and attitudes upon graduation. It would also allow schools/colleges of pharmacy to work together to develop pedagogies and assessments that would ensure all students are practice-ready upon graduation. Achievement of consensus may occur for pharmacists' roles, and no agreement may be found on the competency/EPA mapping and/or the entrustment attainment levels. The lack of consensus on the competency/EPA mapping or the entrustment attainment level would signal the need for more research on the competencies/EPAs and levels of entrustment.

Research Questions

This project will answer the following research questions:

1. What are the core professional roles pharmacy programs believe students should be able to demonstrate competency in upon graduation?
2. What is the alignment of the current pharmacy competencies and entrustable professional activities (EPAs) to the core professional roles?
3. What level of entrustment should pharmacy graduates be expected to achieve for each EPA?

Methodology

This project will be conducted in two phases, using an embedded mixed-method design for each phase (Creswell & Clark, 2011). Different consensus development techniques will be used to collect data during each phase (Delbecq, van de Ven, & Gustafsen, 1975). The use of two different consensus development techniques is preferred for this study. All three research questions require a combination of subjective judgments from multiple people to form one agreed-upon answer and require different data types, group sizes, and anonymity (Delbecq et al., 1975).

The first phase will address Research Question One, developing a set of core roles that define what student pharmacists should prepare to do upon graduation. In Phase One, qualitative data collection occurs via a nominal group technique on the strengths and modifications needed on a core role proposal (discussed in Chapter 3) provided to the study participants. Quantitative data is supportive because the nominal group participants rate the importance of the strengths and modifications discussed (Creswell & Clark, 2011). Conduction of the Nominal Group Technique (NGT) for the proposal review process occurs in four key stages. It typically occurs during a single scheduled meeting: silent generation, round-robin, clarification, and voting (Delbecq et al., 1975). The use of the NGT review process via an internet conference call with an outside facilitator will allow 6-7 experts to provide input into the core roles and ensures no one person dominates the conversation as each group member provides input one at a time. This process will also allow the experts to react to each other's ideas, leading to better quality and quantity of ideas, which is essential when developing a set of core roles for pharmacy practice (Linstone & Turoff, 1975). By the end of the conference call, a set of core roles that define what student pharmacists should prepare to do upon graduation will occur.

Phase Two will use the final core roles created in Phase One to answer Research Questions Two (alignment of competencies and EPAs) and Three (setting the level of entrustment) with simultaneous quantitative and qualitative data collection occurring using a cross-sectional survey via the Delphi technique. In this phase, the qualitative data (constructed-response questions) are supportive of the quantitative data (selected-response questions; Creswell & Clark, 2011). For example, if one of the core roles were Patient Care skills, panelists would be asked their level of agreement regarding the

competency “Provide-patient-centered care as the medication expert” (Medina et al., 2013, p. 3-4) mapped to this role. A larger, more diverse group of pharmacists (i.e., around 40-to 50 with multiple different types of pharmacy practice & different times since graduation) is needed for consensus on the competency/EPA mapping (Research Question Two) and levels of entrustment (Research Question Three) to ensure as many areas of pharmacy have a chance to review the mappings and levels of entrustment. The anonymity provided by the Delphi survey process is crucial as it allows everyone to provide their opinion regarding the mapping and levels of entrustment without feeling pressured to give a particular answer as the surveys are conducted individually with no discussion among the participants (Linstone & Turoff, 1975). The lack of pressure to provide a specific answer is essential, given the lack of consensus currently related to levels of entrustment (VanLangen et al., 2019). By the end of the three-round Delphi process, an exploratory mapping of the current pharmacy competencies and EPAs to the roles defined in Research Question One, along with a level of entrustment for each EPA, will have occurred. After completing Phases One and Two, the data to all three research questions will tie to the broad objective of exploring the development of graduate core practice-ready roles aligned to competencies and EPAs with entrustment levels.

Limitations/Reducing Bias

There are several limitations to a multi-phase mixed methods study, including the number of resources needed, time, and lack of meaningful connection between phases (Creswell & Clark, 2011). Resources will not be an issue with this study as it will be conducted via video conference call for Phase One and via an electronic survey for the second phase. The only resources needed are available free through the University: the conference call platform and access to Microsoft® Word and Forms. The amount of time

required to complete both phases may be an issue. Still, mitigation will occur using the NGT process, which requires only one scheduled meeting and only conducting a maximum of three rounds of the Delphi process. The lack of meaningful connections between the phases can occur in some studies; for example, it may not be clear how the data collected in Phase One is used for the next phase of the project (Creswell & Clark, 2011). A meaningful connection will not be a problem in this project as Phase Two (alignment of competencies/EPAs to the core roles) cannot be completed without Phase One (creation of the core roles).

Disadvantages of the consensus development techniques for Phase Two need considering as well, such as organizing a meeting time, the domination of the conversation by one participant or group of participants, and lack of inter-rater reliability (Delbecq et al., 1975; McMillan et al., 2016). The video conference call should allow for the organization of a meeting time that will suit everyone. Mitigation of one person or group of people (people from one school of pharmacy) dominating the conversation occurs by choice of the NGT method of this project over a focus group methodology. NGT protocol is set-up so that every member of the group gets the opportunity to express their thoughts one at a time in an organized order, thus allowing everyone the chance to express their ideas. The researchers chosen for this project by the Deans will be well-versed in the literature related to this study's topic. They will not be inclined to defer to others' opinions on the subject if they disagree. Once everyone has responded to the question once, the process starts again until no new ideas generate. Another potential area of bias would be having the researcher who developed the proposal lead the NGT process. Mitigation of researcher bias will occur through the use of a facilitator who did

not participate in the development of the proposal but is well known in the field of pharmacy and assessment, so those on the NGT panel will respect her ability to lead the discussion (Delbecq et al., 1975).

Some of the Delphi method's disadvantages include the time it takes to do the process (it can take weeks or months) and the potential for a low response rate to the surveys (McMillan et al., 2016). The time it takes to do the Delphi method will be one big negative to this process, but by combining Research Questions Two and Three into one Delphi survey, it will help limit some of the timetable. The potential for a low response rate will need monitoring and reminders sent to help improve the results. The last drawback is the researcher's potential for bias who is reviewing and combining the results (McMillan et al., 2016). Mitigation of the risk of bias will occur by providing the original and the changed mappings and levels of entrustment in each round of the Delphi process, thus allowing Delphi participants to serve as reviewers.

Besides the limitations of the consensus processes chosen for this study, threats to internal and external validity also need to be considered (Campbell & Stanley, 1963). The risks for external validity that need consideration in this study are sample bias and reactive effects of arrangements (Campbell & Stanley, 1963). Reactive effects of arrangements refer to the inability to generalize to non-experimental settings because the experimental setting is artificial. Reactive effects of arrangements could potentially be a problem in this study since no actual testing of the alignments and levels of entrustment will be happening, and results are from practitioners' thoughts about the appropriate alignments and achievement levels of entrustment. Future studies would need to be conducted in real-world educational settings to determine if this process's entrustment

levels are correct. There is less of an issue with this validity threat as the consensus participants are active practitioners with various experiences. They should be capable of accurately determining what graduates need to perform as an entry-level pharmacist. Sample bias is the other threat to external validity. Sample bias occurs when there is a chance that the sample chosen for the study may not represent the population of interest. Sample bias is a potential threat in this study, given only a small number of pharmacists will be used for the consensus development process. One way this will be mitigated is to use a non-randomized sample to ensure that the sample chosen consists of a diverse mix of pharmacy practice types and levels of experience (Campbell & Stanley, 1963).

The following threats to internal validity also need to be considered: (a) history, (b) maturation, (c) testing, and (d) experimenter bias (Campbell & Stanley, 1963).

History is when events occur during the study that may impact the results, which could be an issue between the Delphi rounds if participants were to change jobs or learn different information that may alter the way they think about the alignments and levels of entrustments between the rounds. Maturation could be a problem as processes with the participants (aging, experience) could impact the outcomes. History and maturation will be mitigated by keeping the time between the rounds to no more than two-three weeks. Another potential internal threat is testing itself. Results are affected when participants do multiple rounds of “testing.” Testing will be mitigated by only using two to three rounds of the Delphi process. The last threat to internal validity is experimenter bias. This bias is when the experimenter’s expectations of the results may consciously or unconsciously affect the results. The experimenter’s expectations will be mitigated through the design of the NGT process for research question one and then through the use of the participants

from the NGT process to review the results of the Delphi process (Campbell & Stanley, 1963).

Significance of the Study

The lack of clarity on pharmacists' roles leads to schools/colleges of pharmacy defining these for themselves, thus leading to differences in curricula and assessment. Secondly, currently, EPAs are not required to be used or assessed per 2016 ACPE Accreditation Standards, and the standards do not provide a level of attainment needed upon graduation (Medina, 2017). Without this standardized set of roles with the EPAs aligned to them and an agreed-upon level of entrustment, it may mean that not all students are graduating with the same minimal expectations potentially to practice.

The development of pharmacists' roles for practice-readiness will impact pharmacy education and practice in several ways. For pharmacy education the roles, competency alignment, and EPA entrustment levels should help to ensure that all graduates possess the same minimal level of competence in knowledge, skills, and attitudes upon graduation that are needed to function in both today's healthcare environment and the future (ACGME, 2017; Frank et al., 2015, & General Medical Council, 2017). Creating a standard set of roles should help move the pharmacy profession forward and expand its role in the healthcare team (Isasi & Krofah, 2015). Having minimal EPA entrustment levels that are consistently agreed upon by the profession will also allow schools/colleges of pharmacy to specialize in areas requiring higher EPA attainment levels before graduation or additional specialty EPAs that are program-specific.

Results from this study will also impact pharmacy research in multiple areas. The first area is the types of assessments that will be useful to determine students have met the

appropriate level of EPAs as well as other assessments that may be required to ensure that students are meeting the full definition of each role. Pharmacy will need to look for ways to ensure that assessments are holistic and review students across the curriculum and not just at one point in time. Arising will also be a need to develop pedagogies appropriate to teach students how to achieve the competencies and EPAs associated with each role.

Definitions/Terminology

Multiple terms and abbreviations need defining to aid in the reading of this dissertation.

1. AACP: American Association of Colleges of Pharmacy; This national pharmacy organization represents pharmacy education in the United States with a mission to advance pharmacy education, scholarship, practice, and service to improve the health of society through partnerships with its members (AACP, 2019a).
2. ACGME: Accreditation Council for Graduate Medical Education; This national medical organization sets and monitors the professional educational standards for physician preparation to ensure delivery of safe, high-quality medical care to all people living in the United States (ACGME, 2019).
3. ACPE: Accreditation Council for Pharmacy Education; The US Department of Education recognizes this national pharmacy organization as the governmental agency for professional degree accreditation in pharmacy. Its mission is to set the pharmacy education standards for schools/colleges of pharmacy to prepare students for the delivery of pharmacists-provided patient care (ACPE, 2019).
4. CanMEDS: This is a physician training framework developed by the Royal College to define competencies for all medical practice areas to provide a medical

education and practice foundation in Canada. This framework was developed based on empirical research, educational principles, and broad consultation of stakeholders. The framework was initially adopted in 1996 and has undergone two revisions since 2005 and 2015 (CanMeds, 2019).

5. CAPE: Center for the Advancement of Pharmacy Education; This is a group of educators and practitioners nominated by practitioner organizations to create outcomes that pharmacy curriculum should aim for students to achieve. CAPE 2013 is the fourth iteration of these outcomes (1992, 1998, and 2004; AACP, 2019b).
6. Competency: Competency is the ability of a health professional to integrate and apply the multiple components of knowledge, skills, attitudes, and values (Frenck et al., 2010; Orgill & Simpson, 2014).
7. Complex world: This is a world where clearly and fundamentally identifiable problems occur even if a clear solution is not immediately seen (Bengtson, 2017).
8. Delphi process: This approach used self-completed questionnaires instead of face-to-face communication to develop consensus from large groups of participants (Linstone & Turoff, 1975).
9. Embedded mixed methods: In an embedded mixed methods design, one type of data collection is predominant with quantitative and qualitative data collection occurring simultaneously (Subedi, 2016).
10. Entrustable professional activities (EPAs): EPAs are considered “units” of professional practice that define the tasks and/or responsibilities that a trainee should be entrusted to perform have he/she has attained sufficient competence in

an area. EPAs are independent, executable, observable, and measurable activities that aid in assessing competencies by translating competencies into clinical practice (ten Cate, 2013).

11. Entrustment: Determination of entrustment occurs by assessing the level an individual can trust someone to complete the tasks. Level 1 is the student can observe but not do, level 2 is execution with direct and proactive supervision, level 3 is the performance with reactive supervision (quickly available), level 4 is execution with supervision from a distance or when asked for, and level 5 is the ability to teach someone else the skill (ten Cate, 2013).
12. Nominal group technique: This technique allows for the collection of qualitative data through semi-structured interview questions. Four key stages comprise NGT: silent generation, round-robin, clarification, and voting (usually done by ranking or rating) (Delbecq et al., 1975).
13. Practice-ready: This is a complex, commonly used term that has many meanings depending on the context to which it occurs. In this paper, the word will be used to mean practitioners prepared for current practice, but that also have the life-long learning skills needed to function in this ever-changing healthcare environment (Wolff et al., 2010).
14. Professional competency: Professional competency is “the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community served” (Epstein & Hundert, 2002, p. 226).

15. Supercomplex world: In a supercomplex world, overloads of data are not manageable by merely adding more resources, and problems are not as identifiable (Barnett, 2000a, 2000b).

Outline of the Dissertation

The remainder of the dissertation will have four chapters. Chapter 2 provides a thorough literature review on the current state of pharmacy and medical education, discusses why changes are occurring and needs to continue to occur in healthcare education, and describes the areas currently missing in pharmacy education that make the need to define practice-ready roles so important. Chapter 3 provides the step by step methods for how the research questions are answered in this project. It discusses the sampling methodology used for the Phase One NGT process and the Delphi process used for Phase Two. It also explains data collection and analysis for each method as well as the timelines for each procedure. It also explains how the two phases of this project are intertwined. Chapter 4 provides the empirical findings that answer each research question. Finally, Chapter 5 will interpret the findings from Chapter 4, explain how the Chapter 4 findings contribute to the body of research in this area and how the results may lead to improvements and future areas of research in pharmacy pedagogy and assessment.

CHAPTER 2: LITERATURE REVIEW

A critical issue in pharmacy education is the production of practice-ready entry-level graduates equipped to engage in 21st-century healthcare (Frenck et al., 2010). The healthcare world is transforming with the use of technology (e.g., telemedicine) and changes in healthcare insurance, the workforce, and regulations (e.g., Affordable Healthcare Act; Vogenberg & Santilli, 2018). The definition of a practice-ready pharmacy graduate has also transitioned to include preparation for current practice and the development of life-long learning skills (Wolff et al., 2010). The job of schools/colleges of pharmacy is to ensure that students are practice-ready, and they possess and can demonstrate the key professional competencies required to meet the needs of an increasingly diverse population. The definition of professional competence is “the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community served” (Epsetin & Hundert, 2002, p. 226). Preparation of practice-ready, professionally competent graduates is a requirement that must be met for schools/colleges of pharmacy to receive accreditation. However, accreditation standards do not provide a true definition of entry-level practice-readiness (ACPE, 2015). To prepare practice-ready graduates, pharmacy needs to define the core roles students need to do upon graduation. The current pharmacy competency statements and entrustable professional activities (EPAs), mapped to these core roles, could then be

used to drive pedagogies and assessments used by schools/colleges to prepare practice-ready graduates.

Schools/colleges of pharmacy use the current pharmacy competencies (Appendix A; Medina et al., 2013) and EPAs (Appendix B; Jarrett et al., 2018) in various ways depending on the pharmacy's program mission and goals. For example, some schools/colleges use the EPAs to assess student's progression throughout the curriculum by defining different levels of EPA entrustment based on a student's professional year in the curriculum. Other schools/colleges use the EPAs to assess students during only the curriculum's experiential portions to tie the didactic competencies with the professional activities seen in the clinical setting (Jarrett et al., 2018). These different usages may mean that students are prepared differently for practice depending on where they graduate. These different uses of the competencies and EPAs also make it hard for schools/colleges to share pedagogies and assessment methods. The purpose of this project is to investigate the extent to which a consensus exists among pharmacy professionals regarding core practice-ready roles for graduates that then align to pharmacy competencies and EPA statements, with levels of entrustment. The creation of a core set of roles with competencies/EPAs that align to them and a standardized level of EPA entrustment would help ensure students' minimal competency upon graduation. Still, it would allow schools/colleges of pharmacy to develop pedagogies and assessments that could be compared across programs to ensure all students are practice-ready upon graduation.

The development of pharmacists' roles for practice-readiness will impact pharmacy education and practice in several ways. For pharmacy education, development of a set of

core pharmacy roles as proposed in this project that then align with the current pharmacy competencies and EPAs (including a standardized level of entrustment for assessment) may help to ensure all pharmacy school graduates possess the same minimal knowledge, skills, and attitudes upon graduation (ACGME, 2017; Frank et al., 2015; General Medical Council, 2017). A standardized level of entrustment is necessary as EPA assessment occurs using five levels of entrustment (described in detail later) that assess increased independence in skill conduction as the level increases (ten Cate, 2013). Still, currently, the pharmacy accreditation standards do not require the use of the EPAs, nor do they define a set level of EPA attainment upon graduation. This lack of required usage and a set level of minimal entrustment makes it hard to compare pharmacy graduate skill attainment across different schools/colleges. Creating core roles upon which the pharmacy competencies, EPAs, and levels of entrustment align may aid schools/colleges in developing shared pedagogies and assessments. This alignment may also provide stakeholders with the ability to compare students' knowledge, skills, and attitudes upon graduation across programs since all schools/colleges would be ensuring all students meet the same minimum standards. Having minimum EPA levels may also allow schools/colleges of pharmacy to specialize (prepare students for residencies or fellowships, prepare students for specific disciplines such as pediatrics) as they can require higher EPA attainment levels before graduation or add additional specialty EPAs that are program-specific without compromising minimal competency. The creation of a core set of pharmacy roles may also help to move the pharmacy profession forward as the profession continues to expand its role on the healthcare team (Isasi & Krofah, 2015) as the core roles will provide a clear definition to other healthcare professions of what

pharmacists can do (knowledge, skills, and attitudes). Lastly, establishing a set of core roles from which all competencies and EPAs evolve will provide a firm basis from which to start the move to full competency-based education, as seen in other healthcare professions (Medina, 2017).

The development of pharmacists' roles for practice-readiness will impact pharmacy research in multiple areas as well. The first research area is the types of assessments that will help determine students have met the appropriate EPA entrustment level as currently there is a lack of data related to the assessment of the EPAs (discussed in detail later). Pharmacy will need to look for ways to ensure that assessments are holistic and review students across the curriculum and not just at one point in time. For example, creating assessments that would assess a student's communication skills at the beginning, middle, and end of the program to ensure skills improved as the student moved through the program. Arising will also be a need to develop pedagogies appropriate to teach students how to achieve the competencies and EPAs associated with each role. For example, in medicine, one of the competencies mapped to the CanMeds Medical Expert role is: "Practice medicine within their defined scope of practice and expertise" (Frank et al., 2014, p. 1). This competency indicates schools of medicine need to have pedagogies that discuss the knowledge and skills required for a physician's scope of practice. An example EPA for this competency would be "Gather a history and perform a physical examination" (Englander et al., 2016, p. 1354). Assessment of student performance on the EPA occurs using the entrustment levels described later with the goal entrustment level based on the stage of the student's career (i.e., lower for medical students, higher for residents). Pharmacy has not created such a concrete mapping that aligns core

pharmacy roles, competencies, and EPAs with entrustment levels. This lack of alignment means schools/colleges are left to determine alignment independently, which may lead to different student preparation for practice depending on where they graduate. Suppose a consensus is not reached during this study on mapping the competencies/EPAs and/or on entrustment attainment levels. In that case, there will be a need for more research on the viability of the current competencies/EPAs and entrustment levels.

The subsequent chapter is organized into five sections. Section 1 reviews healthcare and the role of pharmacy education. The second and third sections review pharmacy and medical education. The fourth section discusses the elements missing from pharmacy education. The last section discusses the theory of learning in a supercomplex world and how this might be used along with the current pharmacy competencies and EPAs to develop pharmacist's roles. This review will then explain the study's purpose and how it will impact pharmacy education and future research areas.

Healthcare and the Role of Pharmacy Education

Vogenberg and Santilli (2018) recently identified multiple themes describing the current healthcare trends driving the US healthcare system's transformation. These themes include changes in (a) technology (e.g., telehealth, telemedicine), (b) healthcare insurance (move to high deductible plans), (c) workforce, (d) drug supply chains, and, lastly, (e) regulatory (Affordable Health Care Act; Vogenberg & Santilli, 2018).

Pharmacy needs to consider these healthcare trends when developing core roles that students should be prepared for upon graduation so schools/colleges can design curricula and assessments that ensure students' minimal preparation for practice in this changing healthcare system.

One of the themes driving today's healthcare system involves increasing technology use to improve healthcare (Vogenberg & Santilli, 2018). Healthcare needs to use more technology to reach rural populations and integrate care for larger populations due to the shift to more primary preventive services. Technology is one way to deal with the current rate of rural hospital closures. One in three rural hospitals is at financial risk due to the decline (loss of 200,000 people between 2010-2016) in people living in rural counties (Vogenberg & Santilli, 2018). Technologies, including telehealth and telemedicine, allow rural hospitals to provide specialty services (e.g., post-operate care) to patients without having to have the service in the town itself (Vogenberg & Santilli, 2018). Telehealth and telemedicine would allow a rural hospital to take advantage of the cost-savings that have been found by having a pharmacist on a healthcare team without having the pharmacist actual on-site. De Rijdt, Williems, and Simoens (2008) conducted a literature review of the economic evaluations of clinical pharmacy interventions in a hospital setting between 1996-2007. To be included, studies had to be in hospital pharmacies, compare the provision of clinical pharmacy services versus no clinical pharmacy services, and compare both costs and outcomes. De Rijdt et al. found when pharmacists participated in multidisciplinary teams, there was more intensive and direct care of patients, which reduced preventable adverse drug events and prescribing errors, thus leading to decreased costs. Without a core set of pharmacy roles that define what pharmacists should do upon graduation, there is no way to ensure student preparation for this move to telehealth practice.

The move to a more primary preventive focus will require a better way for patients to monitor and communicate with pharmacists from their own homes. Technologies such as

consumer wearables or smartphones allow patients to monitor blood pressure and blood sugar at home and send this information electronically to healthcare providers who can make changes in the patient's care without needing to see the patient (Vogenberg & Santilli, 2018). These new technologies will allow pharmacists to provide medication therapy management (MTM) as well as other primary care services (e.g., diabetes medication adjustment), which improve healthcare outcomes and decrease costs (Isasi & Krofah, 2015). Michaels et al. (2010) conducted a retrospective analysis in North Carolina community pharmacies to determine the economic impact of a Medicaid MTM program and assess pharmacist recommendations' acceptance and implementation. Ninety-two pharmacies from one pharmacy chain in North Carolina from August 2006-July 2007 were used for this retrospective review. Medicaid recipients who had received at least 12 prescriptions each month and who completed four quarterly medication reviews by the pharmacists were eligible for the retrospective review. A review of 88 recipients occurred to assess the rate of acceptance of pharmacist recommendations and the overall impact of changing from brand-name medications to more cost-effective alternatives. There was a 62-86% acceptance rate of the pharmacists' recommendations during one year of the research, and this resulted in an average cost savings of \$107 per Medicaid beneficiary. The pharmacists' recommendations led to a total of \$9444 in annual cost savings during the study (Michaels et al., 2010). These technologies will lead to the need for tech-savvy pharmacists and will create potential new career options for pharmacists trained to take advantage of these new areas of practice. One way to potentially ensure students are ready for changing practice is to develop a core set of

pharmacy roles that all graduates should prepare for regardless of the type of pharmacy the student chooses to practice.

Another trend is the changes in healthcare insurance, which has led to consumerism in healthcare. This consumerism is due to the increasing cost of employee healthcare benefits (move to high deductible insurance plans meaning the employee pays more out of pocket before benefits start), cost of physician and hospital visits, and the cost of pharmaceutical medication, especially with the rise of specialty drugs (Vogenberg & Santilli, 2018). The millennial generation will need to share more of the burden of the cost of healthcare. This increase in cost-sharing leads to consumers being more engaged in ensuring they receive the most value for their money. The cost-sharing is also leading to more transparency in healthcare costs, including the cost of prescription medications (Vogenberg & Santilli, 2018). This change will require pharmacists to be more involved in finding cost-effective therapies for patients and educating patients so they receive the best benefit from the therapies they are using and will require pharmacists to be an integral part of interprofessional teams (Frenck et al., 2010). Defining core roles for pharmacists that align with the roles seen in medicine will show other professions what pharmacists can do. Aligning pharmacy competencies and EPAs to these roles will help schools/colleges ensure that all graduates are minimally competent to practice on interprofessional teams.

Another theme involves changes in the current general workforce (Vogenberg & Santilli, 2018). The current workforce is more diverse and has more education than ever before (Pew Research Center, 2016). According to a Pew Research Center report (2016), occupations that require average (associate degree or one-two years of job experience) to

above-average education (college-degree plus additional years of experience or training) has increased from 49 million in 1980 to 83 million (68%) in 2015. The gender demographics are also changing as 47% of the workforce in 2015 were women, increasing over previous years. The age groups that make up the workforce are also changing, with less than half of 16-24-year-olds being employed in 2015 compared to 57% in 2000. Older adults are also staying longer in the workforce, with approximately 62% still working (Pew Research Center, 2016). This make-up requires better communication and different employee benefits than previous generations as healthcare benefits needed by older adults look different than those required for younger adults. The ability to communicate with multiple different entities (patients, caregivers, providers, insurance companies) will be an essential skill to ensure is incorporated into core role development as this is a skill that goes across all pharmacy disciplines.

The last set of themes center around the changes in drug supply chains and government/regulatory changes. Over the last year or two, several new entities have emerged into the drug delivery system. While these new entities provide more options to patients to receive medications at lower costs, they do challenge the healthcare system to have access to all the patient's accurate medical records as patients could receive care and medications through multiple places. The lack of accurate patient medical records makes it even more critical that pharmacists have excellent communication skills, the ability to mobilize knowledge from various sources to formulate a patient's treatment plan, think critically to modify drug therapies, and collaborate with other healthcare providers on both local and global teams (Frenk et al., 2010; Leadbeatter & Peck, 2017). These

knowledge and skills need consideration when developing the core roles for pharmacists as they are essential regardless of the type of pharmacy a student chooses to practice.

The uncertainty of the status of the Affordable Care Act and the withdrawal of many insurance plans from the Affordable Care Act exchanges is also affecting the way patients are seeking care and how healthcare workers are getting paid for providing care (Vogenberg & Santilli, 2018). The change in the way people seek care may open new opportunities for pharmacists in primary care areas since pharmacists are easily accessible. Pharmacists will need soft skills such as ethics and concern for others and be able to engage with perspectives different from their own to participate in these new areas (Frenk et al., 2010; Isasi & Krofah, 2015; Leadbeatter & Peck, 2017). These attitudes will be important to consider when designing the core roles for pharmacy as they are just as important as knowledge and skills regardless of the type of pharmacy practice.

To function as a productive member of a healthcare team based on these themes, a pharmacist will need the ability to imagine entirely new roles for the profession (Barnett, 2000b). Historically, the pharmacist's role was only to dispense medication and devices prescribed by the physician, which tied the pharmacist to the product (medicine). However, today, the role of the pharmacist is in the transition from a product-centered to a patient-centered focus with the pharmacist no longer working in a silo to dispense medication but instead as an integral part of the healthcare team initiating and modifying drug therapies, performing lab tests, and collaborating with other health care providers. These changes in practicing pharmacists' responsibilities and the knowledge, skills, and attitudes needed to execute them have important implications for pharmacy education programs (Barnett, 2000b; Epsetin & Hundert, 2002).

Pharmacy Education

Pharmacy has created a set of professional competency and EPA statements to help schools/colleges of pharmacy educate students. However, the derivation of the professional competency statements did not occur from a defined set of core roles, indicating what graduates should perform. This lack of defined roles leads schools/colleges to define these practice-ready roles based on their interpretations of the competencies. The lack of standardization could lead to students being prepared differently for practice depending on the school/college they choose to attend. The pharmacy education section of this paper will review the current competencies used in pharmacy education, review pharmacy's current use of the EPAs, and discuss knowledge and skills that stakeholders feel need to be taught and assessed to prepare future graduates.

Pharmacy Accreditation Standards 2016 adopted the CAPE 2013 outcomes as the competencies that all schools/colleges of pharmacy need to teach and assess (ACPE, 2015). CAPE 2013 is the fourth version of educational outcomes created to guide curricular and assessment discussions within pharmacy schools/colleges. The CAPE committee for the revision included seven members from the central pharmacy educator organization (American Association of Colleges of Pharmacy [AACP]) and eight members from the Joint Commission Pharmacy Practitioners (JCPP). Rather than starting the development of outcomes based on a set of core roles that students should prepare for upon graduation, the CAPE committee chose to update a previous version of the CAPE outcomes after conducting a literature review from pharmacy and other health professions (Medina et al., 2013). The 15 CAPE outcomes, with one-word descriptors (Appendix A), center around four large domains: Foundational Knowledge, Essentials

for Practice and Care, Approach to Practice and Care, and Personal and Professional Development (Medina et al., 2013). While the CAPE outcomes do roll-up into four broad domains, these domains are student learning outcomes as opposed to roles that student pharmacists should prepare for upon graduation, as is seen with medicine (ACGME, 2017; Frank et al., 2015; General Medical Council, 2017). Secondly, schools/colleges of pharmacy are not provided a framework for pedagogy and assessment for the CAPE outcomes, which leaves it up to the school/college of pharmacy how they want to implement these outcomes to meet the accreditation standards.

Running alongside the CAPE outcomes is the JCPP patient care process, which better defines CAPE outcome 2.1 (Caregiver). The development of the patient care process occurred through a review of several resources on pharmaceutical care and medication therapy management. The method was adopted in May of 2014 as a process to set clear expectations for a patient-pharmacist visit and is a required component of the 2016 Accreditation standards (ACPE, 2015; Bennett, Kilethermes, Derr, & Irwin, 2015). This five-step process is a foundational framework designed to promote students' professional competence in working with other healthcare providers to provide optimum medication use and improved patient outcomes (Kolar, Hager, & Losinski, 2017). It includes: collect, assess, plan, implement, and monitor/evaluate. Collection involves the initial collecting of data from various sources to determine the focus and intensity of the service. Assessment is the use of the data collected to determine the patient's needs as well as reviewing the appropriateness, safety, efficacy, and adherence to the patient's current and anticipated medication therapy. The plan is creating a patient-specific treatment plan in collaboration with the full health care team, patient, and caregivers.

Addressing of medication problems and goals of treatment occur in this step. The implement step is where the plan starts, and patient/caregiver education about the plan's specifics happens. The last step of monitor and evaluate is where the patient is followed over time to monitor for relevant parameters (e.g., lab tests, blood pressure, blood sugar) of care, and when needed, new data are collected to restart the process (Bennett et al., 2015). This process's steps provide a roadmap for pedagogies and assessments for schools/colleges of pharmacy, but it does not stand alone. It is one of the foundations of patient care (CAPE Domain 2) related to other pieces of knowledge, skills, and attitudes (Boyce, 2017). Without a core set of roles defining what graduates should prepare for upon graduation, it is hard to determine what other pieces of knowledge, skills, and attitudes students would need to go along with the patient care process.

A lack of core roles agreed upon by all schools/colleges leaves it up to each school to define these roles for themselves. The lack of core roles also allows each school/college to establish its assessments to determine student preparation for these goals and achievement of the CAPE outcomes as the pharmacy accreditation standards only require that schools/colleges maintain a specific passing rate on the pharmacy licensure exam [North American Pharmacy Licensure Exam (NAPLEX)] which is a knowledge-based exam. Schools/colleges are not held to specific assessment standards related to the CAPE outcomes, making it hard to compare the assessment of the outcomes between programs (ACPE, 2015). One of the problems with assessing competencies like the CAPE outcomes is no assessment method to date can reliably measure competencies separately from one another as independent constructs (Ginsburg, McIlory, Oulanova, Eva, & Reghr, 2010). The EPAs are used by pharmacy and medicine to separate competencies

into measurable units assessable over time and provide a consistent assessment method for comparison across all schools/colleges.

The profession of pharmacy created a set of EPAs to describe what pharmacists do as well as to set expectations and guide future actions in practice. The creation of EPAs occurred because patients, practitioners, and policymakers more easily understand EPAs as opposed to competencies (outcomes) since EPAs assess workplace activities. EPA creation for pharmacy started in 2015-16 with the Academic Affairs Standing Committee of AACP. The AACP president charged this committee to identify EPAs for pharmacy graduates as they transition from completion of their advanced pharmacy practice experiences into professional practice and other postgraduate opportunities. Work continued with the 2016-17 Academic Affairs committee, which compiled comments and input from stakeholders regarding the draft EPAs and completed the final edits (Haines et al., 2017). A list of the fifteen pharmacy EPAs is in Appendix B.

After EPA creation, it was essential to demonstrate the EPAs were valid for schools/colleges to use as an assessment tool. Haines, Pittenger, Gleason, Medina, & Neely (2018) conducted a face validity study on the fifteen core EPAs using a 28-item questionnaire sent to experience pharmacy practitioners affiliated with four schools/colleges of pharmacy. Participants had to be pharmacy practitioners with at least five years of experience that oversaw and graded at least six student pharmacists on experiential rotations in the previous 24 months. Of the participants involved, 89% said the patient care provider domain was where they spent most (61%) of their time, followed by being an interprofessional team member. Seventy-one usable surveys were returned (52% response rate). Participants agreed, with $\geq 75\%$ agreement, that the current

15 EPA statements describe activities pertinent to pharmacy practice and that pharmacists should perform. A consistent level of agreement occurred regardless of the preceptor's employment, board certification status, or postgraduate training completion. Overall, the survey shows that the EPAs developed and vetted by AACCP have face validity (Haines et al., 2018).

EPAs are measured using entrustability scales. An entrustability scale is a behaviorally anchored ordinal scale from progression to competence (Rekman, Gofton, Dudeck, Gofton, & Hamstra, 2016). Pharmacy uses the same definition for the five levels of EPA entrustment as the field of medicine (ten Cate, 2013). Level 1 entrustment suggests a student can observe but not complete a particular task. For example, a student may observe the pharmacist do a patient's medication history, but the student is not yet ready to do the history themselves. Level 2 is execution with direct and proactive supervision. For this level, the student will perform the medication history, but the pharmacist is in the room and can provide advice or add in missing pieces to the history if needed. Level 3 is performance with reactive supervision (quickly available). At this level, the student will perform the medication history alone with the pharmacist in the next room quickly available should help be needed. Level 4 is execution with supervision from a distance or when asked for by the student. For this level, the student is performing the medication history without a pharmacist in the nearby room or even building. The student can be freely trusted to perform the history without any help unless he/she asks for it. Level 5 is the ability to teach someone else the skill (ten Cate, 2013). The AACCP Academic Affairs Standing Committee recommends that pharmacy graduates achieve a

Level 3 (reactive supervision) on each of the 15 core EPAs upon graduation (Jarrett et al., 2018).

Assessment of the EPAs needs to use levels of entrustment, not scores, percentages, or letter grades, which is one of the hard parts in pharmacy education implementation since many pharmacy schools/colleges still provide letter grades for experiential rotations. Like medicine, there is also a lack of remediation plans for those who are not satisfactorily meeting the required level of supervision (Jarrett et al., 2018). The lack of standardization on grading and way to remediate makes it hard to determine the appropriate use of EPAs in pharmacy education to assess student competency upon graduation.

Pharmacy programs use EPA entrustment levels for two specific purposes. One way is to link individual competencies and overall professional responsibilities (e.g., students would need to master each competency related to dispensing a medication before being able to complete the EPA of fulfilling a medication order without supervision). The other way is as a mechanism for faculty to assess the level of supervision for a student (e.g., can a student be trusted to perform this activity alone or does the faculty need to be in the room [no tie to a particular competency]; Jarrett et al., 2018).

Determination of entrustment occurs through assessment of the level one can trust someone to complete the tasks. Determination of a trainee's competence is by not only their knowledge and skills but also their ability to recognize their limitations, their willingness to seek help, and their conscientiousness. Other things that go into entrustability are the context and culture of the workplace, the task complexity and familiarity, and the relationship between the supervisor and trainee. Trust begins to

develop as soon as a supervisor starts working with a student or resident, and judgments of trust usually occur within hours or days based on direct clinical care and team leadership observations. Often, decisions that students make in the clinical setting hold real consequences such as improvement in a patient's health status or even death if a mistake occurs. Because of these consequences, entrustment choices are not easy for supervisors (Damodaran, Shulruf, & Jones, 2017; Hauer et al., 2015). For example, in pharmacy, if a student is entrusted to counsel a patient on medication at a level 3 (pharmacist does not have to be present) and the student makes an error, it is the pharmacist who is ultimately liable for the mistake because they allowed the student to complete the task unsupervised. The consequences of entrustment decisions are one of the negatives to EPA usage. The consequences also make it hard sometimes to get everyone to agree on a specific level of attainment for a given EPA.

While EPAs help define a universal language of assessment for the pharmacy competencies (Haines et al., 2017), there are multiple negatives to EPA usage. One negative is that some see EPAs as just another mandate that schools/colleges of pharmacy need to assimilate into their curricula and assess student progression. Another negative is that some pharmacy educators do not feel that the EPAs reflect all specialized practice areas. Lastly, others have difficulty seeing how the EPAs reflect the content they teach (Haines et al., 2017).

To help schools/colleges understand how EPAs can aid pedagogy and assessment, mapping the EPAs to the CAPE outcomes and JCPP Patient Care Process occurred. Mapping to CAPE and the Patient Care Process occurred because both processes are requirements for assessment in all schools/colleges per accreditation standards (ACPE,

2015; Pittegnier et al., 2017). Table 1 shows how the EPAs integrate with the CAPE outcomes and the Patient Care Process. This mapping helps to demonstrated which competencies and portions of the Patient Care Process, a student would be competent in should they achieve the required level of entrustment (ten Cate, 2013).

Table 1

Mapping of Pharmacy EPA Domains to CAPE and JCPP Patient Care Process (PCPP)

EPA Domain	PCPP	1. 1	2. 1	2. 2	2. 3	2. 4	3. 1	3. 2	3. 3	3. 4	3. 5	3. 6	4. 1	4. 2	4. 3	4. 4
Patient Care Provider	Collect, Assess, Plan, Implement, Follow-up	X	X	X	X		X	X	X	X	X	X				
Interprofessional Team Member	Collect, Assess, Plan, Implement, Follow-up	X					X		X	X		X	X	X	X	X
Population Health Promoter	Collect, Assess, Plan, Implement, Follow-up		X	X	X	X		X	X	X	X	X				
Information Master	Collect, Assess, Plan, Implement, Follow-up	X						X	X		X	X		X	X	X
Practice Manager	Assess, Plan, Follow-up			X			X					X	X	X	X	X

Self-developer	Collect, Assess, Plan, Implement, Follow-up	X	X
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Notes. Adapted from “Report of the 2016-2017 Academic Affairs Standing Committee: entrustable professional activities implementation roadmap,” by A. L., Pittenger, et al., 2017, *American Journal of Pharmaceutical Education*, 81(5), Article S4, p. 9.

To date, there is limited information on the extent to which pharmacy programs’ use of EPAs has driven our understanding of graduating student competency. Conduction of one study occurred in a pharmacy residency program (Moon et al., 2018), another in pharmacy faculty (VanLangen et al., 2019), and another in student pharmacists (Pittenger et al., 2019). A pharmacy residency study conducted by Moon et al. (2018) surveyed all pharmacy residency program preceptors and residents using a Likert scale and free text at the University of Minnesota asking them to describe their perceptions of using the EPAs to assess performance. Results showed that 66.7% of residents and 78.3% of preceptors thought the EPA framework was more helpful than the previously used progressions rating model for all but three of the EPAs with residents achieving an entrustment level of 4 or 5 upon completion of the program. Moon et al. found that leadership skills, developmental planning, and practice management skills were not as easy to assess with the EPAs compared to the old residency progression model. EPAs were useful for assessment in residents with an entrustment level of 4 or 5 being the goal. More research needs to be done on the EPAs related to leadership skills, developmental planning, and practice management skills to determine why residents and preceptors found them hard to assess. The other area that needs more research is the level of entrustment attainment because if residents should be achieving a 4 or 5 upon completion of their resident year,

then it should make sense that student pharmacists should be performing an entrustment level of less than that upon graduation as is recommended by the committee that created the EPAs. However, literature related to student entrustment level attainment does not support this idea. This lack of entrustment attainment standardization makes it hard to use EPAs as an assessment for graduate practice-readiness.

A study by VanLangen et al. (2019) asked faculty to quantify the importance of the current EPAs and their corresponding levels of entrustment. VanLangen et al. found a strong consensus ($\geq 75\%$ agreement) of importance for 13 out of the 15 EPAs. Two of the EPAs only had a moderate consensus (50-74.9% agreement): appropriate use of medication in a population and identifying risk for prevalent diseases in a population. Faculty also could not come to a consensus on the appropriate level of entrustment. Only 10 of the 15 EPAs had a moderate consensus of a level three entrustment recommended by AACCP. The others had rates that spanned across all the entrustment levels (VanLangen et al., 2019). VanLangen et al. is the first published article that has reviewed faculty perceptions of what level of entrustment students should achieve on the EPAs outside of the recommendation made by the standing committee at the time of EPA development. Further research and consensus-building are needed around the minimum entrustment level that students should achieve before graduation. Without a minimum level of entrustment that all schools/colleges should have students achieve, it makes it hard to determine if all graduating students are practice-ready upon graduation as the level of preparedness would depend upon where a student graduated.

Pittenger et al. (2019) studied students' understanding of how the EPAs and levels of entrustment fit into practice. Pittenger et al. surveyed student pharmacists to determine

if students across multiple programs felt the 15 EPAs were relevant to pharmacy practice and if practice settings used the EPAs. Greater than 94% of students perceived relevance for 14 out of the 15 EPAs in practice, with the lowest level of agreement occurring on the EPA for continuous professional development (85% agreement). Greater than 91% of students felt that nine out of the 15 EPA statements represented activities performed in multiple practice settings. With the lowest level of agreement again on continuous professional development (67% agreement). Another one of the lower levels of agreement was for the EPA to identify risk for prevalent diseases in a population (72% agreement), which was also seen as a problem by faculty in VanLangen et al. (2019). These results indicated that students do understand the activities assessed with the EPAs are used in pharmacy practice. However, they see less need for the EPA around continuous professional development, which is essential in this new healthcare environment.

Pittenger et al. (2019) also asked students to rate their level of entrustment on the EPAs as they moved through the pharmacy curriculum as well as areas they felt least prepared to do upon graduation. Students did report feeling they required less supervision in performing the EPAs as they progressed throughout the program with a median entrustment level of 2 for 13 out of the 15 EPAs for first-year students and median entrustment level of 3 for ten out of the EPAs in the second year students. Third-year students indicated an equal split on the EPAs between entrustment levels 3 and 4. Before graduation, fourth-year students showed a median entrustment level of a 4 on 13 out of the 15 EPAs. Students felt the least prepared for EPAs involving overseeing pharmacy operations (57% felt prepared), developing plans for continuous professional

development (42% felt prepared), and establishing patient-centered goals and care plans (32% felt prepared; Pittenger et al., 2019). The Pittenger et al. study shows gaps in understanding how the current EPAs assess the skills needed for practice (i.e., continuous professional development, establishing patient care plans, and overseeing pharmacy operations). Without a set of core pharmacy roles on which to map the competencies and EPAs to it is hard to help students understand the big picture of how the assessments they are doing will determine they are ready for practice upon graduation and what level of entrustment they should be obtaining.

There is limited data on the use of EPAs, especially in student pharmacists, which is not surprising given that the adoption of EPAs just occurred in 2017. Many of the concerns mentioned regarding the use of the EPAs in their early adoption are similar to the fears seen in the medical literature, especially regarding the EPAs not assessing all the skills needed for professional practice (Krupat, 2018). The core EPAs developed by AACP help move the new pharmacy identity from the traditional dispensing role to the medication-related cognitive services roles. Currently, the EPAs are not required to be used as an assessment tool by accreditation, however. The lack of standardization on the use of EPAs and the level of entrustment needed upon graduation makes it hard for schools/colleges of pharmacy to work together on creating assessments as currently, each school/college establishes its assessments based on their interpretations of the competencies and EPAs. The lack of standardization also makes it hard for stakeholders to know what to expect from students upon graduation.

Several stakeholders have discussed the competencies and EPAs that pharmacists should be able to do upon graduation, including employers, specialty practice groups, and

student graduates. Overall, stakeholders support the current CAPE outcomes but discuss additional areas that need adding, as will be discussed in detail in this section. (Alston, et al., 2017; American College of Clinical Pharmacy, 2014; Augustine et al., 2018; Chanakit et al., 2015; Greinter & Knebel, 2003; Hester et al., 2014; Kennie-Kaulbach et al., 2012; McLaughlin et al., 2017; O’Sullivan et al., 2017; Saseen et al., 2017; Thompson et al., 2012; Vlasses et al., 2013). It is important that stakeholders are considered in the formation of the core roles, competency/EPA mapping, and levels of entrustment as the stakeholders are the ones that will be hiring graduates. Most pharmacy graduates are employed immediately upon graduation, unlike medical students who are required to complete a residency where additional training occurs.

Employers and pharmacy organizations. In 2017 the Hiring Intent Reasoning Examination (HIRE) study was conducted to explore the utility of the 2013 CAPE outcomes from the perspective of practicing pharmacists, examining how each attribute influences hiring and identifying which attributes are the most and least valuable (Alston et al., 2017). An electronic questionnaire was developed and distributed to licensed pharmacists in four states (Arkansas, California, Ohio, and North Carolina). Respondents ranked their thoughts about the CAPE outcomes and five other business-related attributes (marketer/sale builder, business manager, producer, team builder, and business operator). A total of 3723 pharmacists responded (10% response rate). Of the fifteen CAPE outcomes and five-plus attributes, ten ranked as being necessary for most or all pharmacist jobs by more than 80% of respondents with the following characteristics have the highest rankings: professional, communicator, problem solver, learner, self-aware, patient advocate, and team builder. These were also areas in which 90% or higher of

employers said had a higher impact on hiring decisions. Areas that were considered less important and were less likely to disqualify a person from employment were: innovator, medication system-manager, business manager, business operator, and marketer/sales. (Alston et al., 2017). Alston et al. (2017) provide information on attributes, based on the CAPE outcomes that practicing pharmacists feel are essential when hiring graduates. This information will be helpful when creating the core roles student pharmacists should be prepared for as it provides information regarding skills employers feel are essential for a practicing pharmacist.

The results of the HIRE study mirror results found in Kennie-Kaulbach et al. (2012) and Thompson et al. (2012). Kennie-Kaulbach et al. was a modified Delphi process to develop and validate primary healthcare pharmacists' competencies in Canada. Core primary health care competencies for pharmacists were drafted based on innovative pharmacy practice, existing entry-level competencies/education outcomes, and a literature review. The competency formatting used the CanMeds template for medicine (Frank et al., 2015). Validation of the competencies occurred by ten pharmacists (leaders in patient care, education, and research in primary care). Once validated, first and second round surveys were sent to 87 pharmacists identified as proficient or expert in primary care. Sixteen pharmacists responded to the first Delphi round, and 33 pharmacists replied to the survey's second round. Pharmacists confirmed the most important primary care responsibilities as being related to direct patient care, including communication, collaboration, and professionalism (Kennie-Kaulbach et al., 2012), all of which are part of the current pharmacy competencies.

Thompson et al. (2012) also discussed the need for skills found in the current competency statements. Thompson et al. conducted a study to determine the most valued characteristics when hiring a new pharmacist using a survey sent to Colorado pharmacists. Pharmacists selected and prioritized the top five characteristics out of 20 that were considered the most important in hiring a new pharmacy graduate. Responses were then reviewed by the practice site (retail vs. hospital) and by role (manager vs. staff). Three hundred eighteen surveys were received, with communication skills be characterized as the highest priority in all groups. Professional behavior and adaptability were also highly ranked in all groups. Critical thinking was considered more important in hospital pharmacy over retail versus efficiency, ranked higher in retail than in a hospital (Thompson et al., 2012). Similar to Kennie-Kaulbach et al. (2012), Thompson et al. found the skills that were most important for pharmacists to have were communication, collaboration, and professionalism, as well as adaptability with critical thinking being essential, depending on the position (Kennie-Kaulbach et al., 2012; Thompson et al., 2012). These skills echo in the pharmacy organization literature; however, the pharmacy organizations due discuss some gaps.

Many pharmacy organizations agree with the stated competencies in HIRE (Alston et al., 2017) for graduates entering clinical practice. Pharmacy organizations discuss the need for additional competencies in systems-based and population health and continuing professional development (American College of Clinical Pharmacy, 2014; Hester et al., 2014; Saseen et al., 2017). Overall, most stakeholders agree that the current pharmacy competencies based on CAPE are an excellent start to train pharmacy graduates, but some studies show potential gaps.

In contrast to the HIRE (Alston et al., 2017) study, Augustine et al. (2018) and O'Sullivan et al. (2017) used semi-structured interviews or focus groups to look at the critical business, management, and human resource skills needed by pharmacy graduates since many graduates assume management positions shortly after graduation. Augustine et al. conducted a focus group study to identify key business, management, and human resource skills needed by pharmacy graduates. Recruitment of twenty-seven preceptors with management positions and 10.5 years of experience from one college of pharmacy in Arizona occurred to participate in the focus groups. Augustine et al. found seven themes related to pharmacy graduates' skills, including communication, time management, conflict resolution, and leadership. O'Sullivan et al. conducted semi-structured interviews with community pharmacy practitioners to design and sequence experiential curricula to prepare students for community practice. Fourteen individuals were interviewed (11 individually and 3 in focus groups). Upon reviewing the interview data, participants identified the outcomes from CAPE and outcomes related to organizational competence, relationship-building, adaptability, and having a provider mentality (O'Sullivan et al., 2017). Skills such as time management, conflict resolution, adaptability, and organization competence are not clearly outlined in the pharmacy competencies.

Another study by Chanakit et al. (2015) echoed similar gaps, as seen in Augustine et al. (2018) and O'Sullivan et al. (2017). Chanakit et al. conducted a cross-sectional survey in 180 hospital pharmacists in Thailand to explore whether students graduating with PharmD degrees were prepared for practice in a hospital pharmacy. Ninety-eight surveys were received (55.6% response rate), and the majority of pharmacists (76.5%)

felt PharmD graduates were prepared for practices. Hospital pharmacists, however, did think that graduates are currently competent in-patient care services and readiness for work but could use more training in health promotion and human relations skills (Chanakit et al., 2015). According to stakeholders, the CAPE outcomes do cover most of the skills needed by students upon graduation. However, there is a need for more competencies in the area of human relation skills (e.g., communication, relationship-building, and management skills (e.g., adaptability, management, conflict resolution). Human relations and management need consideration as some of the core roles that students need preparing for according to stakeholders.

A study by McLaughlin et al. (2017) discusses yet other potential competency gaps. McLaughlin et al. conducted facilitated group discussions to identify core competencies and skills that pharmacists need in today's healthcare environment. Six discussion groups of 15-20 preceptors, pharmacists, and other North Carolina College of Pharmacy partners described the competencies and skills they thought graduating students needed. Identification of eight themes occurred from the discussions, including skills related to initiative, curiosity, imagination, and analyzing information.

The other thing that makes it hard for stakeholders to know what entry-level skills students should have upon graduation is the differences in state laws regulating licensure requirements. Some states require students only to pass the NAPLEX and a law examination, while others require students to pass other competencies such as compounding or medication safety (NABP, 2020). Confusion also occurs due to the extra credentials that pharmacists can achieve both before and after graduation. Credentials like additional master's degrees and medication management certificates can be received

before graduation, while others like residency training and Board Certification have to wait until after graduation (Salahudeen & Nishtala, 2015). It is essential to consider all the skills mentioned by employers and pharmacy organizations needed for employment when considering activities that students should be able to do upon graduation.

Employer/pharmacy organization data should then be triangulated with student graduate perception data to help determine the roles that students need to prepare for upon graduation since the employers are the ones who will be hiring students upon graduation.

Student perceptions. Noble et al. (2014) and Waite et al. (2018) reviewed student perceptions of their practice readiness after graduation. Noble et al. examined the formation of professional identities by Australian student pharmacists using focus groups. Eighty-two students from all levels of a four-year Australian undergraduate pharmacy course were asked questions related to their perceptions of their curricular experiences and how these experiences influenced the development of their professional identities. Many students did not come into pharmacy school with a firm idea of what pharmacy was, making the transition into school difficult. Noble et al. concluded that identity formation needs to be taught from the beginning of the degree program throughout the curriculum, especially for students who may not be thoroughly familiar with all the aspects of pharmaceutical education (Noble et al., 2014). Professional identity formation is essential to know in developing student pharmacists, but it is hard to teach professional identity when the profession has not identified its core roles.

A more recent study by Waite et al. (2018) in Canada examined how recent PharmD graduates feel about providing full-scope pharmacy services using a cross-sectional survey. Recent graduates from two pharmacy schools who worked in community

pharmacy settings in Ontario, Canada, were asked to complete a survey regarding how they felt about performing 14 full-scope pharmacist services (less/more able and less/more sure about completing the task). Many recent graduates said their practice site was “busy” and that they participated in direct patient care 26-50% of the time. For every one-year increase in age, there was an increased chance of the new graduate feeling they were able to perform four services: prescribe or renew prescriptions until a physician visit, prescribe or renew appropriate therapy for three months supply or more, conduct medication reviews, and administer a flu vaccine. Every unit increase in the busyness of a recent graduate’s practice setting, the likelihood of the graduate feeling able to provide a pharmaceutical opinion decreased, and to conduct a medication review increased. Every unit of increase in age was also associated with the likelihood of recent graduates feeling 2.17 times more sure of providing a pharmaceutical opinion and 2.57 times more sure about administering flu vaccines. New graduates had high levels of feeling sure about providing services as long as it is a standard service. Overall, they felt that pharmacy school prepared them for the full scope of their pharmacy practice. Feelings of being sure were affected by age, the busyness of the practice, and the frequency of service performance (Waite et al., 2018). Despite the lack of data in U.S. students, the studies by Nobel et al. (2014) and Waite et al. (2018) show the need for professional development and time management skills in graduating students.

Employers, graduates, and pharmacy organizations all have essential ideas of what roles pharmacists should engage in and the competencies and EPAs that align with these roles. Data from these groups show students need to have CAPE outcomes and human relation skills (e.g., communication, relationship-building) and management skills (e.g.,

adaptability, management, conflict resolution, time-management). Students also need innovation, curiosity, and professionalism. It will be necessary to use a diverse set of stakeholders to form a consensus on the roles and competencies/EPAs created in this project to ensure students' preparedness as generalists upon graduation. Medical education as more recently completed a process of creating broad roles for physicians that then map to competencies and EPAs, which are used for pedagogy and assessment for medical schools and residency programs.

Medical Education

It is essential to remember that both medicine and pharmacy seek to develop professional competence in their students. Professional competence dimensions break down into cognitive, technical, integrative, relational, and affective/moral constructs. The cognitive dimension includes the core knowledge and skills needed to problem-solve (e.g., Learner domain in the pharmacy CAPE Outcomes). The technical dimension consists of those skills that are hands-on and required for a specific type of physician or pharmacy practice (i.e., medication history taking, blood pressure taking). Integration includes linking basic and clinical knowledge to other disciplines and managing uncertainty within the defined clinical setting and place in the physicians' or pharmacist's career. The relationship domain includes the communication skills, teamwork, and conflict-management skills needed to form relationships within the healthcare domain as well as the patient and their families. The affective/moral domain includes emotional intelligence and ethics, consisting of the physicians' and pharmacists' ability to observe their emotional intelligence, curiosity, and willingness to acknowledge and correct errors. These domains all work together to produce a physician and pharmacist capable of functioning in the ever-changing healthcare world to manage ambiguous problems,

tolerate uncertainty, and make decisions with sometimes limited knowledge (Epstein & Hundert, 2002).

The Royal College of Physicians and Surgeons of Canada (CanMEDS), General Medical Council (GMC) in the United Kingdom, and the Accreditation Council for Graduate Medical Education (ACGME) have created roles that all medical school graduates should be competent in upon graduation. These roles center around the cognitive, technical, integrative, relational, and affective/moral dimensions of professional competency. While pharmacy education has started the move towards professional competence and has developed competencies, there is no clear set of roles centered around the concepts that define what graduates should be competent in upon graduation. This lack of standardization makes it hard to determine if all students are minimally prepared to be professionally competent upon graduation regardless of the school/college from which they graduate. This section will discuss the current medical roles that all medical graduates should prepare for upon graduation and how they can formulate the pharmacy roles. Then it will review how medicine built their competencies and EPAs are around these roles.

The medical graduate roles created by CanMEDS, GMC, and ACGME develop a consistent education approach that embeds outcomes and content across all medical curricula and defines the abilities needed for all domains of medical practice regardless of discipline. These frameworks can serve as a template for pharmacy in developing our core roles, as was done in Kennie-Kaulbach et al. (2012) with the creation of roles and competencies for primary care pharmacists in Canada. The CanMEDs' definition of a medical expert is a good summary of all three organizations' definitions of a practice-

ready physician: “physicians integrate all of the roles, applying medical knowledge, clinical skills, and professional values in their provision of high-quality and safe patient-centered care. Medical Expert is the central physician role and defines the physician’s clinical scope of practice” (Frank et al., 2015, p. 3). All three definitions have roles that fit into the cognitive, technical, integrative, relational, and affective/moral dimensions needed for professional competence (Epstein & Hundert, 2002). Table 2 summarizes the broad roles that represent a practice-ready physician according to the three physician organizations (ACGME, 2017; Frank et al., 2015; General Medical Council, 2017). The table lists the roles that all physicians should be prepared for upon graduation and beyond broken down into the five professional competency areas. These three organizational sets of roles are a good starting place for pharmacy when developing pharmacists’ roles since pharmacists participate in many of the same functions as physicians in healthcare practice with just more of medication focus.

Table 2

Medical Practitioner Roles Upon Graduation

CanMEDs 2015	ACGME	General Medical Council
	Cognitive	
Medical Expert	Medical knowledge	Professional knowledge
	Technical	
Health Advocate	Patient care and procedural skills	Professional Skills
	Integrative	
Manager	Systems-based practice	Health promotion and illness prevention
Scholar		Patient Safety and quality improvement
		Education and Training
		Research and Scholarship

Communicator	Relational Interpersonal and Communication skills	Safeguarding vulnerable groups
Collaborator		
Professional	Affective/Moral Professionalism Practice-based learning and improvement	Professional Values/behaviors

Notes. Adapted from. “ACGME common program Requirements [Web page],” by Accreditation Council for Graduate Medical Education., 2017, Retrieved from https://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRs_2017-07-01.pdf; “*CanMeds 2015 Physician Competency Framework*”, by J. R. Frank et al., 2015, Ottawa: Royal College of Physicians and Surgeons of Canada; “*Generic professional capabilities framework*,” by General Medical Council, 2017, Retrieved from www.gmc-uk.org.

The cognitive dimension includes the core knowledge and skills needed to problem-solve. It includes the roles of Medical Expert in CanMeds 2015 (Frank et al., 2015), Medical Knowledge in ACGME (ACGME, 2017), and Professional knowledge in GMC (General Medical Council, 2017). The CanMed 2015 role of Medical Expert is not as explicit as the other two in defining cognitive knowledge. Still, the concept of needing to know foundational knowledge before learning technical, integrative, relational, and affective/moral skills and attitudes is a thread that runs through the Medical Expert definition and the other six CanMeds domains (Frank et al., 2015). Both ACGME and the GMC discuss the need for students to learn foundational knowledge before learning the other concepts, and they have specific roles related to knowledge (Medical Knowledge [ACGME] and Professional Knowledge [GMC]). Pharmacy has already created a foundational knowledge competency (CAPE Outcome 1.1 [Learner]), so creating a role around this would not be difficult.

The technical dimension consists of those skills that are hands-on and required for a specific type of physician or pharmacy practice (i.e., medication history taking, blood pressure taking). CanMeds titles the role that fits into this dimension as Health Advocate, which means a professional that adds their expertise and influence in the community to improve population health (Frank et al., 2015). ACGME and GMC are a little more descriptive in the title of their roles for this dimension: Patient care and procedural skills (ACGME) and Professional skills (GMC). ACGME defines patient care and procedural skills as the ability to provide compassionate, appropriate, and effective care for the treatment of health problems and health promotion (ACGME, 2017). The GMC definition of professional skills is practical skills, communication and interpersonal skills, abilities needed to deal with complexity and uncertainty, and clinical skills (General Medical Council, 2017). Pharmacy has competencies that also fit into this dimension (Appendix A CAPE Outcomes 2.1, 2.3, 2.4, 3.2, 3.3, 4.2), but they cross several of the CAPE outcome domains and do not concretely link to one professional role as is seen in the medicine roles.

Integration includes linking basic and clinical knowledge to other disciplines and managing uncertainty within the defined clinical setting and place in the physician's or pharmacist's career. This dimension occurs in CanMEDS Manager and Scholar roles (Frank et al., 2015), ACGME's systems-based practice role (ACGME, 2017), and GMC's health promotion/illness prevention and patient safety/quality improvement roles (General Medical Council, 2017). A CanMEDs Manager is a leader who engages with others to contribute to a vision of a high-quality healthcare system and takes responsibility for delivering excellent patient care through all activities. A scholar

demonstrates a life-long commitment to excellence in practice through continuous learning and teaching of others and contributions to scholarship (Frank et al., 2015). GMC also has a role related to research and scholarship defined in the same way but also adds a role related to education/training (General Medical Council, 2017). The definition of systems-based practice in the ACGME roles is the awareness of and responsiveness to a broader context and system of health care to provide optimal health care (ACGME, 2017). In the GMC roles, health promotion and illness prevention related to health inequalities and social determinants of health such as income and social status, education, healthy behaviors, and access to health services and patient safety and quality improvement in compass capabilities of leadership/teamwork. Pharmacy does have competencies related to management and leadership (CAPE Outcomes 2.2 and 4.2) and competencies related to health promotion and patient safety (CAPE Outcomes 2.2 and 2.3). Once again, the pharmacy competencies related to these roles cross outcome domains and do not concretely link to a specific pharmacist role. Pharmacy also does not have competencies that explicitly describe scholarship and systems-based practice, which are areas of weakness discussed in the pharmacy stakeholder literature.

The relationship domain includes the communication skills, teamwork, and conflict-management skills needed to form relationships within the healthcare domain as well as the patient and their families. CanMEDS has two roles related to this domain, communicator and collaborator (Frank et al., 2015). ACGME and GMC only have one role associated with this dimension interpersonal and communication skills and safeguarding vulnerable groups (ACGME, 2017; General Medical Council, 2017). The CanMEDS definition of a communicator is forming relationships with patients and their

families that allow the gathering and sharing of essential information needed for adequate health care. A collaborator is a physician that works effectively with other healthcare professionals to provide high-quality patient-centered care (Frank et al., 2015).

ACGME's domain, interpersonal, and communication skills are defined as skills that lead to the effective exchange of information with patients, families, and other healthcare professionals (ACGME, 2017). The GMC role is to safeguard vulnerable groups related to mental health, disabilities, human trafficking, and child and elder abuse (General Medical Council, 2017). Pharmacy does have a CAPE Outcome (3.6) related to communications and one related to interprofessional education (3.4) but does not have one explicated related to safeguarding vulnerable groups.

The last dimension needed for professional competency is related to concepts around affective/moral attitudes, including emotional intelligence and ethics, consisting of the physicians' and pharmacists' ability to observe their emotional intelligence, curiosity, and willingness to acknowledge and correct errors. All three medical groups have roles related to professionalism or professional values, and ACGME adds a role related to practice-based learning and improvement (ACGME, 2017; Frank et al., 2015; General Medical Council, 2017). All three organizations define a professional similarly as one who is committed to the health and well-being of individuals and society through ethical practice, high personal standards of behavior, accountability to the profession, and maintenance of personal health (ACGME, 2017; Frank et al., 2015; General Medical Council, 2017). Pharmacy also has a similar competency (CAPE Outcome 4.4). The definition of ACGME's role related to practice-based learning and improvement is evaluating the care of their patients, using scientific evidence, and improving patient care

based on constant self-evaluation and life-long learning. This role is covered in the pharmacy competencies as well under Outcome 4.1.

These derived medical roles play an important part in the development of the medicine competencies statements used to drive pedagogy and assessment for medical education. All three of the medical organizations have developed competencies for each of the physician roles in their frameworks. A person achieving all the competencies for a given role is said to be “competent” in that area. For example, CanMeds defines five key competencies for the medical expert role. One of these competencies is “practice medicine within their defined scope of practice and expertise” (Frank et al., 2014, p. 10). The creation of assessments occurs from the enabling competencies that are under each of the five broader competencies. For example, under the competency just mentioned, there are six enabling competencies with one being “Integrate the CanMEDS Intrinsic Roles into their practice of medicine” (Frank et al., 2014, p. 10). Pharmacy has developed the competency statements similar to the three medical organizations but has never mapped these to a set of roles to ensure coverage of all roles that pharmacists should be competent in before graduation. This mapping of competencies to core roles would help ensure that all students are prepared for the same core roles upon graduation regardless of the school/college of pharmacy from which they graduated and would also allow the development of assessments to share among schools/colleges pharmacy.

Assessment planning is a critical step to determine if students are practice-ready. It is crucial when setting up assessments to remember that competencies are developmental (Modi et al., 2015). Assessments also require appropriate comprehensive periodic reviews, use of multiple assessors, avoidance of assessment fatigue (both student

and faculty), and optimization of relationships between givers and receivers of formative feedback (Holmboe, Sherbion, Long, Swing, & Frank, 2010; Loackyer et al., 2017). The analogy used many times to describe competency assessment is a ladder where each rung is a level of competency (Modi et al., 2015). Medicine has defined the “ladder rungs” based on a student’s stage in their medical education (medical school, discipline-specific residency, and learning practice). The competency levels in medical school are medical school fundamentals and early clinical activity. Competency levels for residency are transitions to discipline, foundations of the discipline, and core of the discipline. Lastly, competency levels for learning in practice are transitions to practice and continuing professional development (Frank et al., 2014). While pharmacy has created competencies, it has not defined entrustment levels based on students' progress through their careers. It is hard to develop these assessments when pharmacy has not determined the core roles students should prepare for upon graduation as these are the starting point for a practitioner's growth.

Just as discussed in the pharmacy education section, EPAs are a way to link competencies to clinical practice and determine if a student is ready for practice (Rekman et al., 2016). EPAs assess multiple competencies at one time in a holistic manner as they mimic actual physician and pharmacy practice. The EPAs also help link competencies to clinical practice because the EPAs are the tasks/activities that need accomplishment and competencies are the knowledge and skills required to do the EPA (Englander et al., 2016; Rekman et al., 2016). Some examples of the 13 EPAs from medicine include gathering a history and performing a physical examination, prioritizing a differential diagnosis following a clinical encounter, and recommending and interpreting standard

diagnostic and screening tests. For performance activities like entrustable professional activities to be useful, one needs to map the EPA's competencies and set the entrustment level required for each stage of training (Modi et al., 2015). Medicine has created such a mapping with their roles mapped to EPAs competencies with defined entrustment levels for a particular time in a student's learning career (medical school, residency). Pharmacy has developed a set of EPAs (Appendix B), which map to the CAPE Outcomes (Table 1, p.46). However, pharmacy has not created agreed-upon levels of entrustment for each EPA, making it hard to share assessment data between programs.

The core EPAs developed in medicine were designed to be minimum standards for schools/colleges, and then schools/colleges could add on to them as needed for their specific programs. The Association of the American Medical Colleges initially drafted the EPAs for residency, but medical schools are being encouraged to use them. There are several arguments for not using EPAs in undergraduate medical education. One argument is whether workplace activities are an appropriate framework for medical school outcomes and does entrustment apply to students. Another argument is that pre-clerkship learning is knowledge-focused, and workplace assessments such as EPAs do not fit. The case for the use of EPAs during medical school is that schools need to incorporate workplace learning and assessment earlier in the curricula to help students develop their professional identity. Clinical curricula with early clinical experiences vertically integrated and having increased clinical responsibilities over time help improve the clinical abilities of graduates (Chen, van den Broek, & ten Cate, 2015). The literature suggests that medical students should reach the level of indirect supervision (EPA level 3=without a supervisor's physical presence but quickly available) upon graduation from

medical school. Medical schools feel that there must be a defined body of evidence to support the entrustment decisions, and workplace-based evidence is essential.

Assessment tools are still lacking in this area. The pilot schools did feel the core EPAs were an excellent framework. However, work is still needed on assessment development and having space for authentic student work-place participation such as clinical experiences while working on didactic portions of the curriculum in medical school (Lomis et al., 2017). Pharmacy is having the same discussion about using the EPAs during pharmacy school, but the same thoughts apply to the need to incorporate clinical experiences earlier in the curricula as is required in the accreditation standards (ACPE, 2015).

Despite the widespread use of medical EPAs, there are some concerns about their use. Criticisms of the medical EPAs include: not being real discrete, being single-encounter based medical tasks, and sounding more like objectives than tasks. Some feel that the EPAs push professionalism, communicating with patients, and delivering quality patient care to the background, and they do not do enough to interconnect the capabilities to be a physician. There is also a fear that the EPA-based system has not increased medical educators' capacity to make reliable ratings or valid judgments. EPAs still direct too much attention to ordinary and technical skills. There are several recommendations to address some of these issues. One proposal is to create a hybrid model that combines the EPAs and competencies. Another suggestion is to develop a single set of descriptors covering the full range from beginner to master long-term practitioner. EPAs are an area of continued debate and research as the EPAs' usage is just starting in undergraduate medical education (Krupat, 2018).

EPA usage in pharmacy education is a newer concept, yet many of the same discussions in medicine are occurring in pharmacy. The most significant debate in pharmacy currently is the level of entrustment that students should be achieving and the best methods of assessments for EPAs (VanLangen, 2019). Solutions to these debates will be hard to determine until pharmacy has a core set of roles that all students need preparing for upon graduation. Mapping of competencies and EPAs to these roles is one way to help schools/colleges better define assessments and levels of entrustment to ensure students are practice-ready upon graduation. The other thing that mapping to a core set of roles would do would be to help identify gaps (if any) in the current pharmacy competencies and EPAs.

Elements Missing From Pharmacy Education Outcomes and Assessments

Pharmacy has created competencies and EPAs like medicine (Haines et al., 2017; Medina et al., 2013), but because there is no defined set of core roles that pharmacists should be able to do, there is no way to ensure all the competencies and EPAs needed to ensure student practice-readiness upon graduation as listed. The inability to know if the current competency/EPA list is all-inclusive limits pharmacy's ability to begin the move to full competency-based education, as seen in other health professions. One of the biggest benefits of competency-based education is the ability to ensure all students have the same baseline level of skills upon graduation due to the definition of consistent competencies and assessment milestones that all students would need to meet before graduation. Competency-based education allows students to achieve competencies at their own pace as opposed to relying solely on the passage of time (i.e., just because you move from one professional year to another because you passed all courses does not mean you meet all competencies). However, pharmacy is far from moving to full

competency-based education due to multiple factors. One factor is assigning experiential rotations when current state laws dictate a maximum level of students per preceptor. Schools may not have enough preceptors available with the move to full competency-based education, depending on how fast or slow students are moving through the curriculum (Medina, 2017).

Another problem is how to handle faculty workload and assessments when the number of students is not consistent moving through the curriculum and how to handle lock-step curricula that require students to move from one course to another in a specific order. Lastly, opponents of competency-based education fear that this move would mean more emphasis on skills and less on the knowledge. This emphasis on skills could be a problem in a content-heavy profession like pharmacy, thus moving pharmacists back to the product-centered role as oppose to the patient-centered role (Medina, 2017). One way to ensure pharmacy is developing competencies that would allow pharmacists to continue to focus on patients instead of the product is to build competencies similar to other healthcare professions.

Englander et al. (2013) conducted a review of the different competence domains developed for any health care professional to extract a standard set of competencies for use by all health professions to aid in interprofessional education. The ACGME list of six domains and 36 competencies was the starting reference list for the comparison. After reviewing other professions, the addition of two different domains occurred along with 12 additional competencies. Comparison of the list of 48 competencies to the 153 competency lists from across all medical education, including nursing, pharmacy, chiropractic, optometry, public health, physician assistants, dentistry, and veterinary

medicine, occurred. Englander et al. resulted in a final set of 8 domains of competency that could serve as a template for any health profession's development of a competency list.

The eight competency domains include patient care, knowledge for practice, practice-based learning and improvement, interpersonal and communication skills, professionalism, systems-based practice, interprofessional collaboration, and personal and professional development. Comparing the pharmacy competencies to the Englander list shows most of the competencies are within the CAPE 2013 outcomes just under different competency headings (Englander et al., 2013). There are, however, some areas missing in the pharmacy competencies, including transitions of care and providing role modeling as well as specifics related to handling difficult conversations, uncertain situations, conflict management, and stress management. The broad competency domain of "systems-based practice" is not as well developed in the pharmacy competencies either. The "systems-based practice" is one area that pharmacy needs to make more explicit in the competencies and EPAs as there are only one competency and one broad EPA dedicated to this area (Englander et al., 2013).

Pharmacy used a consensus process to develop the pharmacy EPAs and conducted a face validity study, but the face validity study occurred with preceptors that were mainly involved in patient care (Haines et al., 2018). However, to date, no one has done studies looking at the EPAs' face validity using non-preceptors and nonpatient care providers. The survey only asked about the currently written EPAs; it did not ask if they thought any components of the pharmacist role were missing. Only one published study conducted to date has looked at the use of the EPAs in practice, and this study found that

the EPAs were not good at measuring leadership skills, developmental planning, and practice management skills (Moon et al., 2018). The EPAs need reviewing to determine if there is a need for additional EPAs in these areas as they are critical areas for the pharmacist's role given many student pharmacists practice in community settings where they will manage pharmacies and lead people. There have also been no studies to date that have tried to define the roles that student pharmacists should prepare for upon graduation. Without a standard set of roles, similar to medicine, how does pharmacy know that the current competencies and EPAs created are complete and prepare students for 21st-century practice and beyond?

Theory of Learning In a Supercomplex World

The theory of learning in a supercomplex world is one theory to use to transform pharmacy education (Barnett, 2000a). This theory stems from the undergraduate higher education literature and seeks to explain how learning changes based on how society perceives the world: complex or supercomplex (Barnett, 2000a). A complex world is one where handling of facts, data, evidence, tasks, and arguments occur within a framework known by the person (Barnett, 2000a). The complexity arises when demands exceed the resources needed to meet them, which leads to an overload of data. These situations can lead to stress and challenges, but the circumstances are manageable with added resources such as additional people or additional ways to manage data (Barnett, 2000b). In a complex world, clearly and fundamentally identifiable problems occur even if a clear solution is not immediately seen (Bengtson, 2017). For example, in a complex healthcare world, patients' disease states were treated without regard to a patient's social or cultural traits, so a healthcare professional only had to think within their professional knowledge scope to diagnose and treat a patient (Leadbeatter & Peck, 2017).

In contrast, in a supercomplex world, data overload is not manageable by merely adding more resources, and problems are not as identifiable. This lack of manageability and problem identification is because a supercomplex world leads to challenges in our known frameworks due to knowledge and skills continually changing (Barnett, 2000a, 2000b). This conceptual overload leads to challengability, uncertainty, and unpredictability (Barnett, 2000b). One needs to continually learn new knowledge and/or adapt to evolving environments. For example, research telling practitioners what influences different health conditions in patients continuously updates, and a practitioner needs to be able to keep up with this new information and integrate it into their practice (Leadbeatter & Peck, 2017). The ability to keep up with and incorporate further knowledge into practice takes a different teaching and assessment type to prepare students to learn in this type of ever-changing world.

It is important to remember that in a supercomplex world, the knowledge/skills that one develops in school will become irrelevant over time and need to be transportable from one situation to another, so one needs to create continuous learning skills (Barnett, 2000b; Bengtsen, 2017). To help students develop these skills, learners need to discover how they learn, what to do when they encounter strange things, how to engage others, control their learning, manage their personal growth, and listen. Educators must be willing to stretch students out of their comfort zones (force students to face perspectives different from their own), place students in situations of cognitive and experiential complexity, and encourage students to engage each other in different points of view to help them develop these necessary skills (Barnett, 2011; Bengtsen, 2017). Curricula also need to take on three components: knowing, action/skills, and self-identity/attitude

(Barnett, 2000a). These ideas are essential for creating pedagogies in healthcare education that help a student become more self-aware and develop good professional attitudes and the knowledge/skills needed for their profession (Bengtsen, 2017). A more standardized definition of pharmacy roles upon graduation with competencies and assessment EPAs aligned to them would help ensure that all students meet the same minimal standards to be ready for supercomplex healthcare practice regardless of the pharmacy program.

Study Purpose and Potential Implications to Practice and Research

Unlike medicine, pharmacy has not created a minimum set of roles that all pharmacists should be competent in regardless of practice setting. This lack of roles makes it hard to determine a set of competencies and EPA statements to ensure that all students are ready for pharmacy practice as a generalist upon graduation. Currently, schools/colleges of pharmacy use the current competency and EPA statements in various ways depending on the pharmacy program's mission and goals. These different usages mean that students are prepared differently for practice depending on where they graduate. These differences also make it hard for schools/colleges to compare pedagogies and methods of assessment. Answering the research questions for this study will provide a minimal set of roles that students should be competent in upon graduation. This research will also help to align the current competencies and EPAs along with levels of entrustment that can be used by all schools/colleges of pharmacy.

This research will have an impact on pharmacy education and pharmacy practice in several ways. Development of pharmacists' roles for practice-readiness will help ensure that all pharmacy school graduates possess the same minimal level of competence in knowledge, skills, and attitudes upon graduation needed to function in both today's

healthcare environment and the future. Creating a standard set of roles and definitions of these roles will help move the pharmacy profession forward as the profession continues to expand its role on the healthcare team as the defined roles will help identify what the profession can do. Pharmacy, however, will need to be careful setting up these roles as they may intrude on other professional jurisdictions such as medicine and nursing.

Professional jurisdiction is the link between a profession and its work, which can be attacked by other professions. Jurisdiction occurs when a profession takes control of a problem. Most of the time, professions do not have full control of a problem but may split control (i.e., law and accounting over tax practices in the US). One profession may also be subordinate to the other and have a limited sphere of control over the problem (i.e., physician assistants and physicians). Other professions have advisory jurisdiction where a profession offers advice or partial services to clients of other professions (i.e., pharmacy and medicine). Still, others have limited jurisdiction where the profession cannot provide full control but does have control over a piece of the problem (i.e., psychiatry in medicine). Pharmacy is currently seeking to change its jurisdiction into more of a limited jurisdiction model as opposed to an advisory model (Abbott, 1986). Driving this change in jurisdiction is the change in healthcare discussed earlier. Pharmacy needs to be aware of the jurisdictional lines that may need to be adjusted when the roles are created and ensure there is buy-in for these roles, not just from within the profession but also outside. To have these conversations, pharmacy needs to first decide on what roles it wants to undertake.

Having minimal EPA levels that are consistently agreed upon by the profession may also affect pharmacy education. It would allow schools/colleges of pharmacy to

specialize by requiring higher EPA attainment levels before graduation or adding additional specialty EPAs that are program-specific. The concept of having competencies with minimum requirements of attainment for all programs that still allows schools to specialize is not new. This concept is consistent with the concepts discussed in the degree qualifications profile by the Lumina Foundation. This profile defines what degree recipients should minimally be able to do at each degree level in non-professional schools independent of the field of study. The profile allows proficiencies to be weighted and shaped differently according to an institution or program's mission and priorities (termed spider webbing). The key is that each spider web contains all proficiencies, just maybe a different degree of focus or emphasis in one area over another. The profile also allows schools to add proficiencies as needed (Lumina Foundation, 2014). Creating a set of roles for pharmacy students would work similarly in schools/colleges as the Degree Profile. Schools/colleges could emphasize areas differently or add competencies/EPAs following their mission/goals as long as the minimum roles' achievement still occurs.

Results from this study will also have an impact on pharmacy research. One area of research is the types of assessments that will be useful to determine students have met the appropriate level of EPAs as well as other assessments that may be required to ensure that students are meeting the full definition of each role. Pharmacy will need to look for ways to ensure that assessments are holistic and review students across the curriculum and not just at one point in time. Arising will also be a need to develop pedagogies appropriate to teach students how to achieve the competencies and EPAs associated with each role. Lastly, more research may be needed on the current competencies/EPAs or the way pharmacy assesses entrustment, especially if a consensus is achieved on pharmacists'

roles but not on the competency/EPA mapping and/or the entrustment attainment levels. The lack of agreement would signal the need for more research on the competencies/EPAs and levels of entrustment.

Currently, pharmacy has developed a set of competencies and EPAs with the EPAs being a new addition to pharmacy. Schools/colleges are currently working to find ways to incorporate EPAs into their assessment plans. However, with this lack of role definition, how the competencies and EPAs are incorporated, and the level of EPA attainment is different across programs. This lack of standardization may lead to students being prepared differently for practice depending on where they choose to attend school and makes it hard to compare pedagogies and assessments across programs.

CHAPTER 3: METHODS

The purpose of this project is to investigate the extent to which a consensus exists among pharmacy professionals regarding core practice-ready roles for graduates that align with pharmacy competencies and EPA statements, with levels of entrustment. A multiphase mixed-methods experimental design with two phases (Creswell & Clark, 2011) is selected for the study methodology. A multiphase mixed-methods design uses a series of sequentially aligned studies (data building from one study to another) that require collecting a combination of quantitative and qualitative data. A multiphase mixed methods design works well for the research questions in this study as the three questions are all centered around the same broad objective: Exploring the development of graduate core practice-ready roles aligned to competencies and EPAs with levels of entrustment. Empirical findings have the potential to contribute to the development of school/college pedagogies and assessments to ensure all students are practice-ready upon graduation.

This project will use an embedded mixed-method design for both phases. The difference in the two phases will be which data type is dominant and supporting (Creswell & Clark, 2011). The first phase will address Research Question One, developing a set of core roles that define what student pharmacists should prepare to do upon graduation. In Phase One, the qualitative data collection occurs via a nominal group technique on the strengths and modifications needed on a core role proposal (discussed in detail later) provided to the study participants. Quantitative data is supportive because the

nominal group participants rate the importance of the strengths and modifications discussed (Creswell & Clark, 2011). Phase Two will use the final core roles created in Phase One to answer Research Questions Two (alignment of competencies and EPAs) and Three (setting the level of entrustment) with simultaneous quantitative and qualitative data collection occurring using a cross-sectional survey. In this phase, the qualitative data (constructed-response questions) are supportive of the quantitative data (selected-response questions; Creswell & Clark, 2011). For example, if one of the core roles were Patient Care skills, panelists would be asked their level of agreement regarding the competency “Provide-patient-centered care as the medication expert” (Medina et al., 2013, p. 3-4) maps to this role. After completing Phases One and Two, the data to all three research questions will tie to the broad objective of exploring the development of graduate core practice-ready roles aligned to competencies and EPAs with levels of entrustment.

There are multiple advantages to using a multiphase mixed-method design in this study. First, the design offers the ability to address interconnected research questions that require the collection of both qualitative and quantitative data to answer, such as the ones proposed in this study. Research Question One will provide the roles for which the pharmacy competencies and EPAs align in Research Questions Two and Three. Another advantage is the ability to collect rich and comprehensive data since both phases will collect quantitative and qualitative data. Using both data types allows for the collection of participants' thoughts and feelings regarding the topics while still providing numeric values that can be mathematically analyzed (Creswell & Clark, 2011). Another advantage is the ability to analyze and report Phase One findings while completing Phase Two of

the study due to the phases' autonomous nature and methodologies (Creswell & Clark, 2011). This project's studies loosely connect as the answers to the three research questions are needed to fully explore the development of practice roles aligned to competencies and EPAs with levels of entrustment to ensure that pharmacy graduates are practice-ready.

Research Questions

This project will answer the following research questions:

1. What are the core professional roles that pharmacy programs feel should be demonstrated by graduating student pharmacists?
2. According to pharmacy practitioners, what is the alignment of the current pharmacy competencies and entrustable professional activities (EPAs) to the core professional roles?
3. According to pharmacy practitioners, what level of entrustment should pharmacy graduates be expected to achieve for each EPA?

General Methodology

This two-phase mixed methods study will use a different consensus development technique for each phase (two in total; Delbecq et al., 1975). The use of consensus development techniques is preferred for this study, given the research questions' subjective nature. All three research questions require a combination of subjective judgments from multiple people to form one agreed-upon answer (Delbecq et al., 1975). The choice of two different consensus techniques for this study was due to the types of data, group sizes, and anonymity needed for the various research questions. Phase One (Research Question One) will use the nominal group technique (NGT), which allows for the collection of qualitative data as the primary data type using quantitative data to

support the final group decision. Phase Two (Research Questions Two and Three) will use the Delphi technique, which allows for surveys to collect quantitative data with qualitative data as explanations for why specific ratings were selected (Delbecq et al., 1975). A more detailed discussion follows for each methodology used for the research questions.

Research Question One

The first research question is: What are the core professional roles that pharmacy programs feel should be demonstrated by graduating student pharmacists? Research Question One will use the NGT for proposal review process developed by Delbecq et al. (1975). This NGT method offers a framework for gathering stakeholder data on topics that are complex and call for aggregation of individual judgments, such as the development of a set of core roles that define what student pharmacists should prepare to do upon graduation (Research Question One; Delbecq et al., 1975). The NGT proposal review process allows a group of 6-7 experts to review a set of proposed core roles that student pharmacists should prepare to do upon graduation (core role proposal) to provide a group consensus on the strengths and modifications needed to improve the core roles (Delbecq et al., 1975). With the complexity and amount of background literature for review regarding the creation of the proposed core roles, it made sense to provide a group of experts with a draft copy of the core roles derived from the existing pharmacy competencies/EPAs and medical literature to stimulate the constructive formation of a final set of core roles.

The NGT for proposal review process is conducted in four key stages and typically occurs during a single scheduled meeting: silent generation, round-robin, clarification, and voting (usually done by ranking or rating; Delbecq et al., 1975). The use

of the NGT review process via an internet conference call with an outside facilitator (someone not involved in the research project) will ensure all experts can provide input into the core roles and ensures no one person dominates the conversation as each group member provides input one at a time. This process will also allow experts to react to each other's ideas, leading to better quality and quantity of ideas, which is essential when developing a set of core roles for pharmacy practice (Linstone & Turoff, 1975). The group's ideas regarding the core pharmacy roles will be written down and voted on by the participants per the NGT proposal review process rules. By the end of the conference, call a set of core roles that define what student pharmacists should prepare to do upon graduation will occur.

NGT has been used in multiple disciplines (e.g., social sciences) to conduct exploratory research (i.e., to help develop questions for survey and interview field research), allow citizen participation in decisions (i.e., collect information on the design of new products or services), allow multidisciplinary experts to participate in decision making (i.e., to provide solutions to complex problems), and to review proposals (i.e., new policies and procedures; Delbecq et al., 1975). The usage of this method also occurs in pharmacy. It is most often used to generate evidence-based guidelines, inform practice changes, and identify attributes to include when interviewing student pharmacists (Johnson & Traynor, 2018; Kennie-Kaulbach et al., 2012; McMillan et al., 2016). The NGT process is best for Phase One of this project as it will allow aggregation of individual expert judgments on the development of a set of core roles that define what student pharmacists should prepare to do upon graduation (Research Question One)

through the four phases of the process: silent generation, round-robin, clarification, and voting (Delbecq et al., 1975).

A purposeful sampling of 6-7 pharmacy faculty and administrators that have researched the areas of practice-readiness, pharmacy competencies, and EPAs will form the expert panel of participants for the NGT process. The sample size for NGT is usually between 2-14, with a maximum of seven being recommended (McMillan et al., 2016). The use of purposeful sampling is due to the need to select faculty/administrators that have done work in practice-readiness to ensure the panel had the necessary knowledge to form the roles. Deans of four pharmacy programs, three large-research intensive four-year pharmacy programs, and one smaller three-year teaching-intensive pharmacy program will select the panelists. These programs will participate as they have faculty who have done extensive research in pharmacy competencies and EPAs.

Silent generation. The purpose of silent generation, the first step in the NGT process, is to provide adequate time for panelists to reflect on the core role proposal with no interruptions (Delbecq et al., 1975). During this part of the process, panelists write down strengths and potential modifications of the core role proposal without editing their thoughts (stream of thought). Usually, the silent generation process occurs in the first part of the live NGT meeting, but due to the complexity of the core role proposal to answer Research Question One, a slight modification has occurred in this part of the process. Rather than silent generation occurring at the start of the live meeting, panelists will receive the proposal (core pharmacy roles and role definitions), an explanation of proposal creation, the purpose of the proposal review, and worksheets on which to take notes regarding the strengths and modifications needed on the proposed core roles and

their definitions a day or two before the scheduled meeting. Before starting the NGT proposal review process, I will write a proposed set of core roles and role definitions based on published medical roles, literature review, and current pharmacy competencies from Chapter 2 (Appendices A and B). The ability to complete the silent generation process before the initial meeting will allow panelists in this study to more thoroughly review the core roles/definitions and carefully think through strengths and modifications given the proposal's complexity as there would be less of a time constraint (Delbecq et al., 1975).

Round-robin. The second stage of the NGT proposal review process is a two-part round-robin and will be the first stage conducted during the live conference call. The purpose of this 30-45-minute session is to record the strengths and modifications that each panelist generated for the core role proposal during the silent generation step. For this study, the round-robin will occur via video conference due to panelists' locations throughout the country. In the NGT proposal review process, the round-robin occurs in two parts: a review of the proposal strengths and then a discussion of proposed modifications to strengthen the proposal (Delbecq et al., 1975). During the round-robin, each panelist provides their thoughts about the strengths or proposal modifications one at a time in an organized fashion. A MS Word document, visible to the panelists through the video conferencing system, will be used to write down the proposed strengths and modifications generated during the robin-round process (Delbecq et al., 1975).

In Part One, panelists will provide ideas related to the proposed core roles and role definitions' strengths. There are several benefits to this approach, such as allowing for equal participation of all members, depersonalizing the strengths (separating ideas

from the person who provided them since the strengths are written down and shared as a whole), and encouraging members to build off strengths already presented. Starting with a discussion of the strengths of the core role proposal, it avoids the usual problem seen in proposal reviews of focusing strictly on the proposal's negative aspects. Starting with the strengths also helps determine if modifications provided later during the modification discussion will lower the core role proposal's power. Identifying the strengths will also help ensure core roles are not removed, which would weaken the final proposed set of core roles. Panelists continue to give strengths one at a time until all panelists have exhausted their ideas (seen when all members have “passed” when it is their turn). This portion of the process is a free flow of ideas to ensure the generation of all proposal strengths for the clarification and voting steps (Delbecq et al., 1975).

During Part Two, panelists will provide ideas related to modifications to improve the proposed core roles and role definitions. The same benefits from the strengths apply to the modifications, such as allowing for equal participation, depersonalizing the modifications, and encouraging members to build off modifications already presented. Panelists continue to give modifications one at a time until all panelists have exhausted their ideas. This portion of the process is once again a free flow of ideas to ensure the generation of all modifications of the core role proposal for the clarification and voting steps (Delbecq et al., 1975). These modifications will occur to make changes in the final set of core roles and their definitions. The purpose of the discussion is to point out criticism of the core role proposal and provide solutions for the critiques (different roles, different role definitions), thus making the proposal stronger. The NGT proposal review process, as described starting with defining the strengths of the draft core roles and then

moving on to changes, will help to ensure a collegial discussion when discussing the core roles and role definitions. The round-robin step provides the data for the next step, clarification.

Clarification. The clarification stage elicits clarity on each strength and modification. During the clarification stage of the conference call (about 30 minutes), discussion of the core role proposal's strengths and modifications developed during the round-robin phase occurs to clarify any statements, allow questions about any of the statements, and/or provide (dis)agreements for any of the statements. During this section, panelists can convey the logic behind any strength or modification added to the list, as well as reasons they felt the item was essential to add. During this section, it will be necessary to ensure a balanced amount of time spent reviewing each strength and modification to ensure that a review of all strengths and modifications occurs (Delbecq et al., 1975). Once the discussion of both the strength and modifications lists occurs, the group is ready for the preliminary voting stage to determine which proposal strengths and modifications are the most important to the panelists.

Voting. The purpose of the preliminary voting stage is to determine how strongly each panelist feels about a strength or modification of the core role proposal from the clarification phase using a numeric rating method. Aggregation of the individual panelists' numeric ratings occurs to determine a final single rating for a core role proposal strength or core role proposal modification. For example, if there were three panelists and they rated the role proposal strength of "covers all pharmacy roles" on a scale of 0-100 as 50, 70, and 90, the final importance rating for this strength would be 70 (average of all three). Panelists will first rank all items on the core role proposal strength

list from the clarification stage then the core role proposal modification list. This stage will take place on the conference call immediately after the clarification phase and last about 15 minutes (Delbecq et al., 1975).

For this study, a rating procedure will be used for voting since panelists will be participating via video conference call. Panelists will first rate the items via a Microsoft Form, on the core role proposal strength list from the clarification step via a scale of 0-100, then on the role proposal modification list on the same scale. A rating of zero would be assigned to items the panelist feels is the weakest of the strengths (e.g., the panelist may feel that have six roles is not as strong of strength as the roles covering all areas of practice) or the lowest priority modification, and 100 would be the item the panelist feels is the most robust strength or the highest priority modification. I will average the individual panelist's ratings for each strength while the group works on rating the list of modifications on a separate Microsoft Form. After panelists have completed their role modification ratings, computation of an average rating score will occur for each modification like the strengths. Once the preliminary voting finishes, there will be two lists. One list will contain the average ratings for all the core role proposal strengths, and one list will be the average ratings for all the potential modifications for the core roles.

After the preliminary voting finishes, the facilitator will have the panelists take about 20 minutes to review the average ratings for the core role proposal strengths and core role proposal modifications. The purpose of the discussion is to review any strengths or modifications that receive ratings that are outliers (e.g., if the averages on five out of the six strengths are 50-70 and the six strengths is a 10, discussion of this strength would occur). The purpose of this discussion is to ensure that all panelists understand why the

strength or modification discussed was added to the list and what it means before a final vote occurs. The discussion is to ensure no misunderstandings of the strengths or modifications that could influence the voting. This discussion is shorter than the initial clarification section. It may not be needed if the ratings for the strengths and modifications during the preliminary voting do not have any outliers. For this study, the group will not only review the results of the voting but will also set the cut-off limit to make modifications to the preliminary core role proposal (i.e., changes in the roles will only occur for modifications with a rating of >60 points) before the final voting.

Once the preliminary strength and modification voting and a discussion occur, the list of core role proposal strengths and core role proposal modifications will be once again sent to the panelists via email for a final vote. The use of the same rating method from the preliminary vote occurs where each panelist will once again rate their feelings regarding the importance of each core role proposal strength and core role proposal modification on a scale of 0-100 via Microsoft Forms (Delbecq et al., 1975). Once complete, the final mean ratings for each core role proposal strength and each core role proposal modification will occur with the group and take no more than 10 minutes. I will use the final list of core role proposal strengths and core role proposal modifications to create the final set of core roles that student pharmacists should prepare to do upon graduation (Research Question One). This set of roles will form the basis for the survey used in Phase Two (Research Questions Two and Three).

Research Questions Two and Three

Research Questions Two and Three are:

- According to pharmacy practitioners, what is the alignment of the current pharmacy competencies and entrustable professional activities (EPAs) to the core professional roles?;
- According to pharmacy practitioners, what level of entrustment should pharmacy graduates be expected to achieve for each EPA?

These two research questions will occur using the Delphi technique to collect quantitative and qualitative data simultaneously (Delbecq et al., 1975). Like the NGT process, the Delphi technique offers a framework for gathering stakeholder data on topics that call for aggregation of individual judgments such as Research Questions Two and Three. One big difference between the NGT process and the Delphi technique is that the Delphi allows for the collection of data via multiple rounds of surveys instead of a live discussion. The Rand Corporation developed the Delphi approach in 1953 during the Cold War to forecast the impact of technology on warfare. Since then, the technique has expanded to forecasting and policymaking and guideline development (Linstone & Turoff, 1975). The Delphi technique has been used in pharmacy to forecast the future of hospital pharmacy and to gain consensus on indicators for prescribing appropriateness, criteria for safety features, clinically significant interactions, and different aspects of student education (Johnson & Traynor, 2018; Kennie-Kaulbach et al., 2012; McMillan et al., 2016). The Delphi approach's general method is a multistage self-completed survey (Delbecq et al., 1975). The Delphi method is useful for this study as it a way to aggregate the judgments of numerous (40-50) individuals to gather consensus around the mapping of competencies and EPAs to the core roles (Research Question Two) and the assignment of levels of EPA entrustment (Research Question Three; Delbecq et al., 1975).

Research Questions Two and Three seek to examine if there is a broad consensus from different pharmacy practices on the competency/EPAs (Research Question Two) mapped to the core roles developed in Research Question One and assign levels of entrustment to each EPA (Research Question Three). A larger, more diverse group of pharmacists (i.e., around 40-to 50 with multiple different types of pharmacy practice, different times since graduation, various interactions with student pharmacists) is needed for this consensus to ensure as many areas of pharmacy have a chance to review the mappings and levels of entrustment. The anonymity provided by the Delphi survey process is also crucial as it allows everyone to provide their opinion regarding the mapping and levels of entrustment without feeling pressured to give a particular answer as the surveys are conducted individually with no discussion among the participants (Linstone & Turoff, 1975). The lack of pressure to provide a specific answer is essential, given the lack of consensus currently related to levels of entrustment (VanLangen et al., 2019). By the end of the Delphi process, an exploratory mapping of the current pharmacy competencies and EPAs to the roles defined in Research Question One, along with a level of entrustment for each EPA, will have occurred.

Within this study, a panel of 40-50 pharmacists from a variety of different pharmacy disciplines, including, for example, community, institution, clinical, and academia, will review the proposed mappings and levels of entrustment. The suggested panelist size for a Delphi process is seven, but sizes can range from 4-3000 depending on the project's needs. The size needs to be determined by the qualities required on the panel more than size. (Linstone, 1978). A purposeful, non-randomized sample procedure will occur to select participants in the Delphi panel to ensure consensus from as many

pharmacy practice areas and years in practice (minimum of one year). Panelists from the NGT group in Research Question One will provide a list of 5-10 people via a Microsoft form. The form will collect the Delphi participant's name, pharmacy degree, practice site, year of graduation from pharmacy school, and email. NGT participants need to ensure that participants chosen come from a variety of different pharmacy disciplines (ensure at least three disciplines are covered in the list) and from different years of experience (at least one participant in each time-frame since graduation [1-5 years, 6-10, 11-15, >15]). A non-randomized sample is best to use in this study as participants in the Delphi process need to be from various pharmacy disciplines and years of experience to ensure representation from as many areas of pharmacy practice in the sample as possible. There is potential for bias and for not including all potential views given the study's non-random nature. Minimization of this bias occurs through the use of various schools/colleges of pharmacy and different regions of the country to draw the sample.

This approach's general method is a multistage self-completed survey (ies; Delbecq et al., 1975). Data previously gathered in Phase One will be used to develop the survey instrument in this investigation. Specifically, I will map the current pharmacy competencies/EPAs to the set of core roles created during the NGT process (Research Question One) and assign a level of entrustment for each EPA. The mapped competencies/EPAs and levels of entrustment will form the individual survey questions for the Delphi process, where participants will rate their level of agreement with the mapping as well as the level of entrustment on a 4-point Likert scale. Participants will receive a constructed-response box for each question to explain if they disagreed with a

mapping or level of entrustment. A more formal description of the survey questions follows in the Round 1 discussion.

Surveys for all rounds will be sent out based on the Tailored Survey Design process (Dillman, Smyth, & Christian., 2014). For each Delphi round in this study, sending an initial email will occur with the instructions and the survey link. A reminder email will be sent weekly for a total of three emails (each round will be open for a total of 3 weeks). Emails will be sent before the start of the workday as studies have shown that people are more likely to respond to surveys sent early in their workday before their day gets too busy (Dillman et al., 2014).

Round 1. In round 1, the Delphi questionnaires will comprise selected- and constructed-response questions to gather data on stakeholders' consensus on the competency/EPA mappings and levels of entrustment. Each Delphi participant (panelist) will rate their level of agreement with each competency and EPA role aligned to the roles from Research Question One using a 4-point Likert scale from 1 (*Strongly Disagree*) to 4 (*Strongly Agree*). For example, if one of the roles were Patient Care skills, panelists would be asked if they agree or disagree that the competency "Provide-patient-centered care as the medication expert" (Medina et al., 2013, p. 3-4) and its associated EPAs map to this role. Panelists will also be asked in a separate question to rate their agreement with the level of entrustment before graduation they feel a student should achieve for the specific mapped EPA using the same Likert scale. Entrustment is defined as the level one can trust someone to complete a task (e.g., take a patient's medication history). Level 1 entrustment suggests a student can observe but not complete a particular task. For example, a student may observe the pharmacist do a patient's medication history, but the

student is not yet ready to do the history themselves. Level 2 is execution with direct and proactive supervision. For this level, the student will perform the medication history, but the pharmacist is in the room and can provide advice or add in missing pieces to the history if needed. Level 3 is performance with reactive supervision (quickly available). At this level, the student will perform the medication history alone with the pharmacist in the next room quickly available should help be needed. Level 4 is execution with supervision from a distance or when asked for by the student. For this level, the student is performing the medication history without a pharmacist in the nearby room or even building. The student can be freely trusted to perform the history without any help unless he/she asks for it. Level 5 is the ability to teach someone else the skill (ten Cate, 2013). Panelists will be provided an open-ended comment box after each question to give suggestions for rewording the competency/EPA, change in the alignment, or change in entrustment level.

Results from the selected-response (Likert scale) questions will be aggregated into two categories: Category 1 - *Strongly Agree/Agree* and Category 2 – *Disagree/ Strongly Disagree* from each panelist's response. Computation of the percent number of responses for each category will then occur for each question. For example, if 50 participants completed the survey with 30 indicating *Strongly Agree* and 10 indicating *Agree* for a question, then the percent response for Category 1 (*Strongly Agree/Agree*) would be 80%. For there to be consensus on the competency/EPA alignment or the level of entrustment question, there must be a category score of 80% *Strongly Agree/Agree* for the question. Data from the literature states that cut-offs for consensus can range from 51-80% (Hasson, Keeney, & McKenna, 2000). A cut-off of $\geq 80\%$ was chosen for this study to

be conservative and in line with other pharmacy Delphi studies (Johnson & Traynor, 2018). Once a competency mapping, EPA mapping, or level of entrustment question has reached an agreement level of 80%, it will not be included in the subsequent rounds.

A review of constructed-response comments occurs for any question that did not achieve consensus (80% agreement) using structural coding via NiViVo software (NiViVo qualitative data analysis software, 2019). In structural coding, a content-based or conceptual phrase is assigned a segment of data based on the survey question being asked to develop themes around the survey question. For example, in this study, constructed-responses may be left regarding a change in the entrustment level assigned to a particular EPA. A review of each comment will occur to determine the themes for why the entrustment level should be changed (e.g., themes might include students will not be able to practice this EPA enough in school to achieve more than a level 3) and what the suggested levels are. The themes generated for both the mapping to the core roles and EPA levels will be used to make changes in the survey questions for Round 2 (Saldaña, 2016). For example, suppose the comment themes suggest mapping a particular competency or EPA to a different role. In that case, the Round 2 survey question will indicate this new mapping and ask for the level of agreement. For example, if panelists suggested the competency “Provide-patient-centered care as the medication expert” (Medina et al., 2013, p. 3-4) needed mapping to another role besides Patient Care Skills like maybe Medicine Exert, the Round 2 question would then ask for the level of agreement on mapping to this new role. Panelists will receive the themes for the comments that suggested the change in mapping, so they understand why the change occurred.

Round 2. In Round 2, panelists will receive a summary document and a new survey. The summary document will be a quantitative summary for all survey questions and a qualitative summary of questions that did not reach consensus for each competency/EPA statement and level of entrustment. This summary will include the total percent *Strongly Agree/Agree* and *Disagree/Strongly Disagree* of all panelists on the question and themes developed from any open-ended comments provided (if the question did not reach consensus). The new survey will gather data on the updated competency/EPA mappings and any updated entrustment levels after review of the quantitative and qualitative data from Round 1. The survey will contain new questions constructed based on changes made to the questions from Round 1 that did not reach consensus. Removal of competencies/EPAs and entrustment levels that achieved 80% agreement during Round 1 will occur for the Round 2 survey.

The new Round 2 survey questions will be constructed and analyzed in the same manner as Round 1. The Delphi questionnaires will comprise selected- and constructed-response questions to gather data on stakeholders' consensus on the updated competency/EPA mappings and levels of entrustment that were created based on the data from Round 1. Each panelist will rate their level of agreement with each new competency and EPA role alignment or level of entrustment using the same 4-point Likert scale from Round 1: 1 (*Strongly Disagree*) to 4 (*Strongly Agree*). Panelists will also have constructed-response boxes to provide comments if needed. Results from the selected-response (Likert scale) questions will once again be aggregated into two categories: Category 1 - *Strongly Agree/Agree* and Category 2 – *Disagree/ Strongly Disagree* for each panelist's response. Computation of each category's percent number will then occur

for each question like in Round 1. For there to be consensus on the competency/EPA alignment or the level of entrustment, there must be a category score of 80% agree/strongly for the question. Once a competency mapping, EPA mapping, or level of entrustment has reached an agreement level of 80%, it will not be included in the subsequent rounds.

A review of constructed-response comments occurs again for any question that did not achieve consensus (80% agreement) using structural coding via NiViVo software (NiViVo qualitative data analysis software, 2019) just as in Round 1. Just as discussed for Round 1, the themes generated for the mapping to the core roles and EPA levels will be used to make changes in the survey questions for Round 3 (Saldaña, 2016). Panelists will receive the themes for the comments that suggested the change in mapping, so they understand why the change occurred.

Round 3. Round 3 will only need conducting if all competency/EPA alignments and levels of entrustment have not met the 80% consensus level after Rounds 1 and 2. Round 3 will follow the same procedure from Round 2, where panelists will receive a summary document and a new survey. The summary document will be a quantitative summary for all survey questions and a qualitative summary of questions that did not reach consensus for each competency/EPA statement and level of entrustment from Round 2. This summary will include the total percent *Strongly Agree/Agree* and *Disagree/Strongly Disagree* of all panelists on the question and themes developed from any open-ended comments provided (if the question did not reach consensus). The new survey will gather data on the updated competency/EPA mappings and any updated entrustment levels after review of the quantitative and qualitative data from Round 2. The survey will contain

new questions constructed based on changes made to the questions from Round 1 that did not reach consensus. Removal of competencies/EPAs and entrustment levels that achieved 80% agreement during Round 2 will occur for the Round 3 survey.

The new Round 3 survey questions will be constructed and analyzed in the same manner as Round 1. The Delphi questionnaires will comprise selected- and constructed-response questions to gather data on stakeholders' consensus on the updated competency/EPA mappings and levels of entrustment created after Round 2. Each Delphi participant (panelist) rate their level of agreement with each new competency and EPA role alignment or level of entrustment using the same 4-point Likert scale from Round 1: 1 (*Strongly Disagree*) to 4 (*Strongly Agree*). Panelists will also have constructed-response boxes to provide comments if needed. Results from the selected-response (Likert scale) questions will once again be aggregated into two categories: Category 1 - *Strongly Agree/Agree* and Category 2 – *Disagree/ Strongly Disagree* for each panelist's response. Computation of the percent number of responses for each category will then occur for each question like the previous rounds. For there to be consensus on the competency/EPA alignment or the level of entrustment, there must be a category score of 80% agree/strongly for the question. Competency/EPA mappings or entrustment levels will not be included in the final mapping document if they have not reached the 80% level of agreement after Round 3. Completion of all Delphi rounds will answer Research Questions Two and Three. Formulation of a final set of competencies and EPAs that align with Research Question One's roles will occur along with a setting of a level of entrustment for each EPA. Each panelist will receive the final structure of roles/definitions, competency/EPA alignment, and entrustment levels.

Once both Phases (One and Two) of this research project conclude, all three research questions will have an answer:

1. What are the core professional roles that pharmacy programs feel should be demonstrated by graduating student pharmacists?
2. According to pharmacy practitioners, what is the alignment of the current pharmacy competencies and entrustable professional activities (EPAs) to the core professional roles?
3. According to pharmacy practitioners, what level of entrustment should pharmacy graduates be expected to achieve for each EPA?

The Phase One NGT process answers Research Question One by defining the core professional roles that graduating student pharmacists should demonstrate upon graduation. This process also defines these roles to allow for easier alignment of the current pharmacy competencies and EPAs to these roles. The Phase Two Delphi process answers Research Questions Two and Three, as this process provides a consensus agreement of the alignment of the current pharmacy competencies and EPAs to the roles from Phase One. This process then provides a consensus on the level of entrustment that pharmacy graduates should expect to achieve for each EPA mapped to the roles.

Limitations

Despite the advantages of a multiphase mixed methods study, there are still several limitations that need addressing. One limitation is the number of resources and time required to complete these types of studies (Creswell & Clark, 2011). Resources will not be an issue with this study as the study will be conducted via video conference call for Phase One and via email and electronic survey for the second phase. Another limitation is the lack of meaningful connection that can occur between the phases. For

example, in some studies, it may not be clear how the data collected in Phase One is being used for the next phase of the project (Creswell & Clark, 2011), which is not a problem in this study as Phase Two requires the results from Phase One. Phase One results will provide the roles, definitions, and alignments needed to complete the Delphi process in Phase Two.

Disadvantages need considering for the consensus development techniques chosen for Phase Two of this study. One downside of NGT is that it may be challenging to organize the meeting at a time that suits everyone, which will be overcome via the video conference call. This method has been used in the past for the consortium group and works well. Another problem with any group meeting is the potential for one or more participants to dominate the conversation or push their views, thus making some participants feel uncomfortable expressing their thoughts (McMillan et al., 2016). Mitigation of the problem of one person or group of people (people from one school over the others) dominating the conversation occurs by choice of the NGT method of this project over a focus group methodology. NGT protocol is set-up so that every member of the group gets the opportunity to express their thoughts one at a time in an organized order. The NGT process will allow everyone to express their strengths and modifications of the proposal and control one person dominating the conversation. The mitigation of the conversation domination will occur by requiring each person to respond to the discussion question before the next person answers. Once everyone has responded to the question once, the process starts again until no new generation of strengths and modifications occurs. Also, the researchers chosen for this project by the Deans will be well-versed in the literature related to this study's topic. They will not be inclined to defer to other's

opinions on the topic if they disagree. Another potential area of bias would be having the researcher who developed the proposal lead the NGT process. Mitigation of researcher bias is through the use of a facilitator who did not participate in the development of the proposal but is well known in the field of pharmacy and assessment, so those on the NGT panel will respect her ability to lead the discussion (Delbecq et al., 1975).

Some of the Delphi method's disadvantages include the time it takes to do the process (it can take weeks or months) and is the potential for a low response rate to the surveys (McMillan et al., 2016). The time it takes to do the Delphi method will be one big negative to this process, but by combining the research questions into one Delphi survey, it will help limit some of the timetable. The potential for a low response rate will need monitoring and reminders sent to help improve the results. The last drawback is the researcher's potential for bias who is reviewing and combining the results (McMillan et al., 2016). Mitigation of the risk of bias will occur by providing both the original and the changed mappings and levels of entrustment in each round of the Delphi process, thus allowing Delphi participants to serve as reviewers.

Besides the limitations of the consensus processes chosen for this study, threats to internal and external validity also need to be considered (Campbell & Stanley, 1963). There are four threats to external validity to consider: (a) sample bias, (b) reactive effects of testing, (c) reactive effects of arrangements, and (d) multiple treatment interference (Campbell & Stanley, 1963). Reactive effects of testing and multiple treatment interference will not be a problem in this study. Reactive effects of testing occur when the giving of a pretest may affect the experimental testing results, and no pretest will happen with this study. Multiple treatment interference occurs when numerous treatments occur

in an experiment differently than in the real-world, thus making the results hard to replicate. Multiple treatment interference will not be a problem in this study, as no interventions occur. Reactive effects of arrangements refer to the inability to generalize to non-experimental settings because the experimental setting is artificial. Reactive effects of arrangements could potentially be a problem in this study since no actual testing of the alignments and levels of entrustment will be happening; instead, results are from practitioners' thoughts about the appropriate alignments and entrustment levels achievement. Future studies would need to be conducted in real-world educational settings to determine if the entrustment levels are correct. There is less of an issue with this validity threat as the consensus participants are active practitioners with various practice experience. They should be capable of accurately determining what graduates need to perform upon graduation. Sample bias is the last threat to external bias. Sample bias occurs when there is a chance that the sample chosen for the study may not represent the population of interest. Sample bias is a potential threat in this study, given only a small number of pharmacists will participate in the consensus development process, which may lead to a lack of diversity (i.e., race, age, rural/urban practice sites). One way mitigation will occur is to use a non-randomized sample chosen by the NGT process members to ensure that the sample selected is a diverse mix of pharmacy practice types and levels of experience (Campbell & Stanley, 1963). The NGT process participants will select participants with different races, different lengths in practice, from different areas of the state (rural vs. urban), and at least one from the required ACPE practice sites that all students need exposure to upon graduation (ACPE, 2015).

Threats to internal validity also need to be considered. Internal validity threats include (a) history, (b) maturation, (c) testing, (d) instrumentation, (e) statistical regression, (f) selection, (g) mortality, (h) placebo, (i) contamination effect, (j) Hawthorne effect, (k) experimenter bias, and (l) interaction effects (Campbell & Stanley, 1963). Many of these threats are not a problem in this study, as it is not an experimental model with a treatment group. Statistical regression, selection, mortality, placebo, contamination, Hawthorne effect, and interaction effects are not internal threats to this study as the study does not place people into groups, nor is there an intervention or treatment provided or compared between groups. Instrumentation will not be an issue as the use of the same survey occurs throughout the study. While the survey stems may change between the Delphi rounds based on the participants' open-ended comments, the rating scale will remain the same. History, maturation, testing, and experimenter bias are potential threats to internal validity that need consideration. History is when events occur during the study that may impact the results, which could be an issue between the Delphi rounds if participants were to change jobs or learn different information that may change the way they think about the alignments and levels of entrustments in between the rounds. Maturation could be a problem as processes with the participants (aging, experience) could impact the outcomes. History and maturation will be mitigated by keeping the time between the rounds to no more than 2-3 weeks. Another potential internal threat is testing itself as results are affected when participants do multiple rounds of “testing.” Testing will be mitigated by only using two to three rounds of the Delphi process. The last threat to internal validity is experimenter bias, which occurs when the experimenter’s expectations of the results may consciously or unconsciously affect the

results. The experimenter's expectations will be mitigated through the design of the NGT process for Research Question One and then through providing both the original as well as the changed mappings and levels of entrustment in each round of the Delphi process, thus allowing Delphi participants to serve as reviewers to ensure researcher bias is mitigated (Campbell & Stanley, 1963).

Summary/Statement of Significance

Pharmacy has implemented competency statements and EPA concepts from medicine, but it has not established a consensus set of roles that define a practice-ready pharmacist. The lack of clarity leads to schools/colleges of pharmacy defining this for themselves. There is also some debate on the entrustment level that needs assigning to the EPAs (VanLangen et al., 2019). Without this standardized set of roles with the EPAs aligned to them and an agreed-upon level of attaining the EPA, it may mean that not all students are leaving with the same minimal expectations potentially to practice. A standard set of roles with competencies and EPAs aligned to them, as would be created by answering the research questions in this study, would ensure that all schools/colleges of pharmacy are providing students with the minimum level of training necessary to be a practice-ready pharmacist upon graduation and be able to move into any pharmacy or post-graduate training. These standard roles and aligned competencies and EPAs with levels of entrustment will allow schools/colleges of pharmacy to collaborate on researching the best practices for pedagogy and assessment.

CHAPTER 4: RESULTS

Introduction

A multiphase mixed-methods experimental design with two phases (Creswell & Clark, 2011) was used for the study methodology. The multiphase mixed-methods model used a series of sequentially aligned studies (data building from one study to another) that required the collection of a combination of quantitative and qualitative data. A multiphase mixed methods design worked well for the research questions in this study as the three questions were all centered around the same broad objective: Exploring the development of graduate core practice-ready roles aligned to competencies and EPAs with levels of entrustment. Empirical findings have the potential to contribute to the development of school/college pedagogies and assessments to ensure all students are practice-ready upon graduation. The following research questions answered the broad objective of this study:

1. What are the core professional roles pharmacy programs believe students should be able to demonstrate competency in upon graduation?
2. What is the alignment of the current pharmacy competencies and entrustable professional activities (EPAs) to the core professional roles?
3. What level of entrustment should pharmacy graduates be expected to achieve for each EPA?

The two-phase mixed methods included using different consensus development techniques for each phase (two in total; Delbecq et al., 1975). The use of consensus

development techniques was preferred for this study, given the subjective nature of the research questions asked. All three research questions required a combination of subjective judgments from multiple people to form one agreed-upon answer (Delbecq et al., 1975). The choice of two different consensus techniques for this study was due to the types of data, group sizes, and anonymity needed for the various research questions. Phase One (Research Question One) used the nominal group technique (NGT), which allowed for the collection of qualitative data as the primary data type using quantitative data to support the final group decision. Phase Two (Research Questions Two and Three) used the Delphi technique, which allowed for surveys to collect quantitative data with qualitative data as explanations for why specific ratings were selected (Delbecq et al., 1975). This chapter discusses the results of the NGT and Delphi processes used to answer each particular research question.

Research Question One

Research Question One answered the question: What are the core professional roles pharmacy programs believe students should be able to demonstrate competency in upon graduation? The NGT for proposal review census development technique was used to answer this question. An initial set of proposed core roles (Appendix C) that student pharmacists should prepare to do upon graduation (core role proposal) was provided to an expert group to gather consensus on the strengths and modifications needed to improve the core roles (Delbecq et al., 1975). With the complexity and amount of background literature for review regarding the creation of the proposed core roles, it made sense to provide the group with a draft copy of the core roles derived from the existing pharmacy competencies/EPAs and medical literature to stimulate the constructive formation of a final set of core roles.

Five people from four different colleges/schools of pharmacy participated in the NGT process plus a non-participating facilitator. The facilitator for the NGT process was from a college/school of pharmacy not affiliated with the project and had experience conducting focus groups. Purposeful sampling was used to select the NGT participants due to the need to select faculty/administrators that had done work in practice-readiness to ensure the panel had the necessary knowledge to discuss the roles. Deans of four pharmacy programs, three large-research intensive four-year pharmacy programs and one smaller three-year teaching-intensive pharmacy program selected the panelists. The programs selected to provide participants had faculty who have done extensive research in pharmacy competencies and EPAs. Each program provided at least one NGT participant. Four of the NGT participants were from research-intensive, four-year pharmacy programs, and one participant was from a three-year, teaching-intensive program. All participants had earned Doctor of Pharmacy degrees. The participants' average number of years of academic experience was 11.6 years (8.5 *SD*), with a range of academic experience from 2 to 20 years. All participants had experience in the areas of pharmacy school assessment, experiential education, or teacher development.

The NGT proposal review process took place via an internet conference call system. The total call lasted a little under two hours. The first 10 minutes of the call was a general overview of each part of the proposal review process. The review of the strengths of the proposal occurred over four rounds lasting 30 minutes. A discussion on potential modifications for the proposal occurred over seven rounds and lasted 45 minutes. Preliminary voting for both rounds took about 10 minutes each and the final voting about the same amount of time.

The initial core role proposal that participants started with had a pharmacotherapeutic expert as the central role. The central role defined a pharmacotherapeutic expert as one who integrates all the core roles such as knowledge, appropriate patient care skills, and professionalism to provide high-quality and safe patient-centered care. Being a pharmacotherapeutics expert was considered the central role of a pharmacist and defined the pharmacist's scope of practice. Seven core roles were then initially proposed to define further a pharmacotherapeutic expert: knowledge, patient care skills, professional, scholar, systems-based practice/manager, collaborator, and advocate/health promoter. The full initial core role proposal is in Appendix C.

The strengths' round-robin and clarification stages of the NGT process identified sixteen strengths of the initial core role proposal. A rating procedure was used for the preliminary voting stage since panelists were participating via video conference call. Panelists first rated the strengths via an on-line Microsoft Form on a scale of 0-100. Panelists assigned a rating of zero to items they felt were extremely weak strengths, and 100 for items the panelist felt were the strongest strengths. Averaging of individual panelist's ratings for each strength then occurred. Before voting, the group also set an average rating cut-off to indicate strengths that needed further clarification before the final voting. The cut-off selected was determined through a consensus voice vote of the group. A cut-off of an average rating score of 60 or below identified items that needed further clarification. Four of the five NGT participants voted on the strengths during the preliminary voting stage.

During the round-robin and clarification phase, one strength identified was participants "liked [that] added knowledge and patient care skills" were included in the

roles. The average rating score on this role was 69, with a range of 45-80. Despite having one rating below 45, all participants' average rating was above 60; thus, this strength did not need further clarification before the final voting. Another strength identified was "alignment with and overlap between this and other resources – CAPE and other standards – helps with external validity." This strength had an average rating of 76, with a range of 40-90. Again, despite having one rating below 60, the average participant rating was above 60; thus, this strength did not need further clarification before the final voting. Table 3 reports the full list of strengths generated during the initial NGT process, along with the results of the initial vote.

Table 3

Initial Core Pharmacist's Role Proposal NGT Strength Results

Initial Strengths	Participant 1	Participant 2	Participant 3	Participant 4	M
Central tenet is about being a pharmacotherapy expert (not just a drug expert)	95	85	100	50	83
Liked added knowledge and patient care skills	70	80	80	45	69
Broad, good mix of different topics/roles that any pharmacy graduate should be able to perform upon graduation	75	95	100	60	83
Clear interplay between components – all tie together	90	60	50	100	75
Alignment with and overlap between this	85	90	90	40	76

and other resources – CAPE and other standards – helps with external validity					
Evidence-based and patient centered terms were included	80	75	80	35	68
Scholarship – liked blend/listing of variety of different ways that scholarship could be included	60	60	10	55	46
Different components such as advocate and systems/based manager – adds layer of complexity to being a pharmacist was we are taking on more in the healthcare system	60	80	90	65	74
Personal wellness (of pharmacist) was highlighted	80	70	80	80	78
Most of the components of the PCPP were included throughout	60	80	100	90	83
Advocate/Health promoters – liked ways different roles were laid out and were specific	80	60	80	10	58
Thread of patient- centered care throughout all of the areas	75	70	90	85	80

Advocate/health promoter – population health was included here	70	60	70	20	55
Collaborator – included other providers but also included the patient	85	75	80	75	79
Professionalism – included society as a whole	90	50	70	70	70
Systems-based/manager – health care insurance and health care economics	80	85	40	30	59

Upon reviewing the full results after the initial round of voting on the proposal strengths, four strengths were identified as having an average rating score of less than 60. Outliers were discussed with the group to determine the rewording of the strengths, if needed, before the final vote. The purpose of the clarification step was to ensure the group members understood the intent of the statement before the final voting. Statements either had words added or changed to ensure everyone understood the purpose of the statement. Only the final strength, "Systems-based/manager – health care insurance and health care economics," was reworded before the final vote. The strength was reworded to "Systems-based/manager – health care insurance and health care economics were specifically highlighted as these are often left out for pharmacists."

The final voting stage used the same rating procedure as the preliminary voting stage. Panelists rated the strengths via an on-line Microsoft Form on a scale of 0-100. Once again, panelists assigned a rating of zero to items they felt were the weakest of the

strengths, and 100 to items they felt were strong strengths. Averaging of the individual panelist's ratings for each strength then occurred. The group used the same average rating cut-off as the preliminary voting stage of >60 to identify items that were strong enough strengths to ensure they remained as part of the final core roles after modifications were made. Once again, four of the five NGT participants rated the strengths during the final voting stage.

The final vote found all strengths were above the cut-off score, meaning that all the areas listed were strengths of the proposal. For example, one of the strengths was the "central tenet is about being a pharmacotherapy expert (not just a drug expert)." This strength had an average rating of 87 with a range of 50-100. This strength means the participants felt it was essential to ensure the pharmacotherapy expert idea did not get removed during the modification stage. Another strength was "Evidence-based and patient-centered terms were included." The average rating for this strength was 84, with a range of 75-95. Once again, because the average was greater than 60, the group felt it was essential to ensure inclusion of the terms "evidence-based" and "patient-centered" in the final version of the proposal. Once the modification round was completed, and changes made in the proposal, it was essential to review this table of final strengths to ensure the inclusion of all the concepts listed in the final proposal. If one of the strengths was removed based on a modification, it was added back since the participants felt all of these strengths were vital to include in the final proposal. Table 4 contains the final list of strengths, along with the results of the final voting.

Table 4

Final Core Pharmacist's Role Proposal NGT Strength Results

Final Strengths	Part 1	Part 2	Part 3	Part 4	Part 5	<i>M</i>
Central tenet is about being a pharmacotherapy expert (not just a drug expert)	100	95	90	50	100	87
Liked added knowledge and patient care skills	90	70	80	80	50	74
Broad, good mix of different topics/roles that any pharmacy graduate should be able to perform upon graduation	90	80	95	90	92	89
Clear interplay between components – all tie together	80	90	60	90	60	76
Alignment with and overlap between this and other resources – CAPE and other standards – helps with external validity	90	85	90	80	35	76
Evidence-based and patient centered terms were included	80	80	75	90	95	84
Scholarship – liked blend/listing of variety of different ways	60	60	60	80	55	63

that scholarship could be included						
Different components such as advocate and systems/based manager – adds layer of complexity to being a pharmacist was we are taking on more in the healthcare system	70	60	90	90	65	75
Personal wellness (of pharmacist) was highlighted	90	80	70	70	70	76
Most of the components of the PCPP were included throughout	80	75	90	80	80	81
Advocate/Health promoters – liked ways different roles were laid out and were specific	80	80	60	80	20	64
Thread of patient-centered care throughout all of the areas	80	75	80	80	75	78
Advocate/health promoter – population	80	70	70	80	30	66

health was included here						
Collaborator – included other providers but also included the patient	80	85	80	90	85	84
Professionalism – included society as a whole	70	90	60	75	90	77
Systems-based/manager – health care insurance and health care economics were specifically highlighted as these are often left out for pharmacist	60	80	90	90	40	72

The modifications round-robin and clarification stages of the NGT process identified seventeen potential modifications for the initial core role proposal. The same rating procedure as the strengths portion was used again for the modification preliminary voting stage. Panelists first rated the modifications via an on-line Microsoft Form on a scale of 0-100. Panelists assigned a rating of zero to items they felt were unnecessary modifications, and 100 for items they felt were vital modifications. An average of the individual panelist's ratings for each modification then occurred. Before voting, the group also set an average rating cut-off to identify modifications that needed further clarification before the final voting. The cut-off selected was determined through a consensus voice vote of the group. A cut-off of an average rating score of 60 or below

indicated items that needed further clarification. All five NGT participants voted on the modifications during the preliminary voting stage.

One potential modification was "Pharmacotherapeutics expert: Should include all the other tenets – focus of the two bullets are clinical – systems-based practice/manager is missing – double check all other tenets are covered there." The average rating for this modification was 82, with a range of 40-100. Despite having one rating of <60, the average was above the cut-off to potentially be included in the final list of modifications to make on the proposal. Another potential modification was "Pharmacotherapeutics expert – central tenet – seems to have a very heavy clinical tenet – is there another term that can be used – maybe change to medication expert." The average rating for this modification was 58, with a range of 20-80. As written, this modification was currently below the cut-off of 60, meaning the modification would not be made in the final proposal if the average rating remains this low after the final vote. The full list of potential modifications generated during the initial NGT modification process with the initial vote results is in Table 5.

Table 5

Initial Core Pharmacist's Role Proposal NGT Modification Results

Initial Modifications	Part 1	Part 2	Part 3	Part 4	Part 5	<i>M</i>
Knowledge – bullet 1: psychological is not usually part of the pharmacist role so what level of knowledge would be expected there	75	30	80	30	70	57
Pharmacotherapeutics expert: Should include all the other tenets – focus of the	100	100	70	40	100	82

two bullets are clinical – systems- based practice/manager is missing – double check all other tenets are covered there Drug information seeking is missing (using resources to find and provide information)	0	90	70	100	90	70
Pharmacotherapeutics expert: is expert the right word – consider another word	80	30	40	50	60	52
Patient care skills – first bullet: steps through domains of PCPP but implementation is not concretely there	100	100	60	90	90	88
Pharmacotherapeutics expert: second bullet – monitor/follow-up is missing there	100	95	80	90	90	91
Patient care skills – role of PCPP is there but needs to be more on the relationship with the patient (empathy, other emotions)	90	30	50	75	70	63
Scholarship – likes examples but makes it seem that a pharmacist needs to all of these things – needs to be more of an example list	100	40	30	80	90	68

Scholarship – use of data needs to be here (health informatics)	0	90	70	50	80	58
Scholarship – advancement of the profession (professional advocacy); changing future roles for pharmacists	100	70	80	60	90	80
Systems-based Practice – first bullet – population health/public health	50	80	60	80	80	70
Quality care mentioned in several places but quality improvement is not explicated stated	100	85	70	80	60	79
Collaborator – bullet 2 – "safe, high quality, and effective patient care" – comes through in several places – be consistent in document	80	40	60	80	90	70
Should "evidence-based be included" – bullet 1 on collaborator maybe to replace "high quality"	0	80	50	80	80	58
Collaborator – bullet 2 – "Must understand role of others on the team" – pharmacists need to be able to articulate their role on the team	100	90	65	80	60	79

Missing from CAPE: Innovator seems to be missing	100	80	70	80	80	82
Pharmacotherapeutics expert – central tenet – seems to have a very heavy clinical tenet – is there another term that can be used – maybe change to medication expert	80	70	70	50	20	58

After the preliminary round of voting for the modifications, a review of results occurred to determine items that met the cut-off selected through a consensus voice vote of the group to be outliers. A cut-off of an average rating score of 60 or below indicated items that needed further clarification. There were five outliers identified to have an average of <60. The group discussed the five outliers, and clarification of all five statements occurred. The purpose of the clarification stage was to ensure the group members understood the intent of the statement before the final voting. Statements either had words added or changed to ensure everyone understood the purpose of the statement. There were five outliers discussed with clarifications made. The first outlier discussed was "Knowledge - bullet 1". Participants felt that psychological is not usually part of the pharmacist role, so they were confused about what level of knowledge would be expected for this bullet. Rewording of "Knowledge bullet 1" occurred to "psychological is not usually part of the pharmacist role, so what level of knowledge would be expected there – change is psychosocial." The second outlier discussed was "Pharmacotherapeutics expert." The participants discussed whether expert was the right word and suggested

considering another word. "Pharmacotherapeutics expert" was reworded to

"Pharmacotherapeutics expert: is expert the right word – consider "optimizer."

Another outlier discussed was under Scholarship. Participants discussed the need to have the use of data mentioned here, specifically the use of the term health informatics. Rewording of this bullet occurred to "Use/Analysis of outcomes data needs to be included (health informatics/quality improvement)." Another outlier was under bullet one in collaborator. Participants thought evidence-based should maybe replace the term high quality. This bullet was reworded to "Should evidence-based be added to bullet one on collaborator." The last outlier discussed was the central tenet of "Pharmacotherapeutics expert." Participants felt this term had a very heavy clinical tenet, so they wondered if another term was available. Rewording of the Pharmacotherapeutics expert statement occurred to "Pharmacotherapeutics expert – central tenet – seems to have a very clinical tenet – is there another term that can be used – maybe change to pharmacy expert."

The final voting stage used the same rating procedure as the modification preliminary voting stage. Panelists rated the modifications once again via an on-line Microsoft Form on a scale of 0-100. Panelists assigned a rating of zero to items they felt were the weakest of the modifications, and 100 to items they felt were the strongest modifications. An average of the individual panelist's ratings for each modification then occurred. The group used the same average rating cut-off of >60 (as determined during the preliminary voting stage) to identify modifications needed before finalizing the core role proposal. Once again, all five NGT participants rated the modifications during the final voting stage.

The final vote found that sixteen out of the seventeen modifications were above the cut-off of > 60. These results meant the panelist felt strongly these sixteen modifications were necessary to clarify the proposed core roles' central tenet, core role definitions, and to ensure all core pharmacists' roles that pharmacists should be prepared to do throughout their careers were in the proposal. For example, one modification was "Drug information seeking is missing (using resources to find and provide information)." The average rating for this modification was 76, with a range of 30-100. Despite having one rating of below 60, the average was still above the cut-off for inclusion in the modifications. The proposal was modified to ensure the inclusion of drug information in describing one of the core roles. Another modification made before finalizing the core roles was "Pharmacotherapeutics expert – central tenet – seems to have a very heavy clinical tenet – is there another term that can be used – maybe change to pharmacy expert." The average rating for this modification was 68, with a range of 0-100. Again, even though there was a rating of <60, the overall average was high enough to make this modification. Based on this modification, the name of the central tenet was changed. Another modification that was voting on was "Pharmacotherapeutics expert: is expert the right word – consider "optimizer." The average rating for this modification was 34, with a range of 0-60. This modification did not meet the score of >60, meaning the inclusion of this modification did not occur in the core role proposal. The final list of potential modifications, along with the results of the final voting, is in Table 6.

Table 6

Final Core Pharmacist's Role Proposal NGT Modification Results

Final Modifications	Part 1	Part 2	Part 3	Part 4	Part 5	<i>M</i>
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Knowledge – bullet 1: psychological is not usually part of the pharmacist role so what level of knowledge would be expected there - change is psychosocial	100	80	90	80	80	86
Pharmacotherapeutics expert: Should include all the other tenets – focus of the two bullet is clinical – systems-based practice/manager are missing – double check all other tenets are covered there	100	70	100	90	50	82
Drug information seeking is missing (using resources to find and provide information)	100	70	90	90	30	76
Pharmacotherapeutics expert: is expert the right word – consider "optimizer"	60	40	10	0	60	34
Patient care skills – first bullet: steps through domains of PCPP but implementation is not concretely there	100	70	100	90	100	92
Pharmacotherapeutics expert: second bullet – monitor/follow-up is missing there	100	80	95	90	100	93
Patient care skills – role of PCPP is there	70	50	50	70	90	66

but needs to be more on the relationship with the patient (empathy, other emotions)						
Scholarship – likes examples but makes it seem that a pharmacist needs to all of these things – needs to be more of an example list	100	30	80	80	80	74
Use/Analysis of outcomes data needs to be included (health informatics/quality improvement)	90	70	90	80	80	82
Scholarship – advancement of the profession (professional advocacy); changing future roles for pharmacists	85	80	80	80	100	85
Systems-based Practice – first bullet – population health/public health	80	60	80	80	30	66
Quality care mentioned in several places but quality improvement is not explicated stated	80	70	90	80	50	74
Collaborator – bullet 2 – "safe, high quality, and effective patient care" – comes through in several places – be consistent in document	90	60	50	90	50	68

Should "evidence-based" be added to bullet 1 on collaborator	80	50	80	80	30	64
Collaborator – bullet 2 – "Must understand role of others on the team" – pharmacists need to be able to articulate their role on the team	80	65	90	80	100	83
Missing from CAPE: Innovator seems to be missing	80	70	80	80	100	82
Pharmacotherapeutics expert – central tenet – seems to have a very heavy clinical tenet – is there another term that can be used – maybe change to pharmacy expert	100	70	70	100	0	68

The final set of core roles after making the sixteen modifications and ensuring the sixteen strengths were kept is in Appendix D. The final core role proposal answered Research Question One: What are the core professional roles pharmacy programs believe students should be able to demonstrate competency in upon graduation? Upon completion of the NGT process, pharmacy expert became the central role of a pharmacist. The NGT process then defined a set of core roles students should be able to demonstrate competency in upon graduation to ensure they are ready for the central role of pharmacy expert. These core roles included knowledge, patient care skills,

professionalism, scholarship, systems-based practice, and collaborator. Further description of each core role provided direction on what specific knowledge and skills are needed to be considered competent in that particular role. The core roles developed during the NGT process will be used to answer Research Questions Two and Three:

1. What is the alignment of the current pharmacy competencies and entrustable professional activities (EPAs) to the core professional roles?
2. What level of entrustment should pharmacy graduates be expected to achieve for each EPA?

In the second phase of this study, mapping the current pharmacy competencies and EPAs to the core roles developed during the NGT process and assignment of entrustment levels for the EPAs occurred. A modified Delphi process was used to determine consensus on the mapping to the core roles and levels of EPA entrustment. The answer to these two research questions will help determine gaps in the current pharmacy competencies/EPAs based on the core roles.

Research Question Two

Research Question Two was: According to pharmacy practitioners, what is the alignment of the current pharmacy competencies and entrustable professional activities (EPAs) to the core professional roles? Usage of the Delphi technique to simultaneously collect quantitative and qualitative data (Delbecq et al., 1975) answered Research Question Two. Like the NGT process, the Delphi technique offered a framework for gathering stakeholder data on topics that call for aggregation of individual judgments. Therefore, Research Question Two addressed the extent to which there is broad consensus from different pharmacy practices on the competency/EPAs (Research Question Two) mapped to the core roles developed in Research Question One.

In this research, the CAPE outcomes, along with the corresponding mapped EPAs, were used as the pharmacy competencies/EPAs to map to the roles created during Research Question One (ACPE, 2015; Pittegnier et al., 2017). The initial mapping of the competencies/EPAs to the core roles are in Appendix E. The mapping document created the Delphi survey for round one. For example, participants were presented a role with a competency and its EPAs underneath. Participants were then asked to report their level of agreement with the alignment of that particular competency/EPA(s) as a group to the pharmacy roles on a four-point Likert scale (1 = *Strongly Disagree* to 4= *Strongly Agree*). Participants also could leave open-ended comments to explain their ratings. The knowledge role had one competency with five EPAs mapped. The patient care skills role had five competencies with 5-12 EPAs mapped depending on the competency. Professionalism had four competencies mapped with 3-4 EPAs for each competency. Scholarship had three competencies mapped with 2-6 EPAs under each competency. Systems-based practice/manager had four competencies mapped, each with 2-9 EPAs. Collaborator had four competencies mapped, each with 1-6 EPAs. Lastly, the advocate/health promoter had four competencies, each with 4-8 EPAs. Overall, participants were asked to review 25 different competency/EPA mappings during round one for the seven different roles.

Delphi surveys typically use a 5-point Likert scale allowing participants to choose a neutral response (McMillian et al., 2016). The choice of a 4-point Likert scale was to force participants to agree or disagree, given the questions' nature. The use of a 4-point Likert scale is also in-line with other Delphi studies done in pharmacy education (Johnson & Traynor, 2018). Aggregation of the results from the selected-response (Likert

scale) questions into two categories occurred: Category 1 - *Strongly Agree/Agree* and Category 2 – *Disagree/ Strongly Disagree* from each panelist's response to determine consensus achievement. Computation of the percent number of responses for each category then occurred for each question. For example, if 50 participants completed the survey with 30 indicating *Strongly Agree* and ten indicating *Agree* for a question, then the percent response for Category 1 (*Strongly Agree/Agree*) would be 80%. For there to be consensus on the competency/EPA alignment, there had to be a category score of $\geq 80\%$ *Strongly Agree/Agree* for the question. Data from the literature states that cut-offs for consensus can range from 51-80% (Hasson et al., 2000). A cut-off of $\geq 80\%$ was chosen for this study to be conservative and in line with other pharmacy Delphi studies (Johnson & Traynor, 2018). A review of constructed-response comments occurred for any question that did not achieve consensus ($<80\%$ agreement) using structural coding via NiViVo software (NiViVo qualitative data analysis software, 2019). Once a mapping reached consensus ($\geq 80\%$ *Strongly Agree/Agree*), it was no longer included in subsequent round surveys.

Panelists from the NGT group in Research Question One provided a list of people to participate in the Delphi survey via online Microsoft form. The form collected the Delphi participant's name, pharmacy degree, practice site, length of time in pharmacy practice, and email. NGT participants ensured that participants chosen came from various pharmacy disciplines and different years of experience. The initial Delphi participant list was a total of 63 people [University of Arkansas = 14 (22.2%); Sullivan University = 19 (30.2%); University of North Carolina = 17 (27.0%); and University of Minnesota = 13 (20.6%)]. All but one participant had a PharmD degree. The other participant had a Ph.D.

degree. Nine participants (14.3%) had >20 years of experience, 26 (41.3%) had 11-20 years of experience, 22 (34.9%) had 5-10 years of experience, and six (9.5%) had <5 years of experience. Twenty-three (36.5%) participants were male, and 40 (63.5%) were female. The Delphi participants' demographics represent the make-up of the pharmacy profession, which has more females than males. Forty-five (71.4%) practiced in urban locations, 15 (23.8%) practiced in rural sites, and 3 (4.8%) practice in mixed sites. Thirteen (20.6%) participants were acute care pharmacists, 18 (28.9%) were ambulatory care pharmacists, six (9.5%) were hospital pharmacists, 11 (17.5%) were community pharmacists, seven (11.1%) were in academia, three (4.8%) were in pharmacy management, and five (7.9%) were in other types of pharmacy practice.

Round One. The first round Delphi survey had a total of 24 participants respond (38% response rate). Six (25%) of the respondents had >20 years of experience, 10 (41.7%) had 11-20 years of experience, six (25%) had 5-10 years of experience, and two (8.3%) had <5 years of experience. Seven (29.2%) respondents were male, 15 (62.5%) were female, and two (8.3%) preferred not to answer. Seventeen (70.8%) had practice sites in urban locations, and seven (29.2%) had rural practice sites. Seven (29.2%) respondents were acute care pharmacists, eight (33.3%) were ambulatory care pharmacists, four (16.7%) were community pharmacists, three (12.5%) were in academia, and two (8.3%) were in other types of practice.

As defined in Research Question One, the knowledge role was: "Pharmacists must be able to integrate knowledge of biomedical and psychosocial science principles of health and disease, and clinical science to design appropriate treatment plans for their patients. This knowledge includes understanding these principles across the life-span of the

patient. Pharmacists understand that they serve a unique role in the healthcare team. They are the "medication" experts and possess the most knowledge of how medications contribute to the patient's care." There was one competency with five EPAs mapped to the knowledge role. Consensus was achieved ($\geq 80\%$ *Strongly Agree/Agree*) for the mapping to this role, so this role's inclusion did not occur in the round two survey. The results are below in Table 7. The competency mapped under the knowledge role contains all of the knowledge elements defined by this role, but the EPAs are not specific. While participants felt the EPAs under this role were correct, the EPAs are general and leave the specific knowledge to be learned to be determined by the pharmacy school/college.

Table 7

Competencies/EPAs Mapped to Knowledge Role

Competency	EPAs	<i>Strongly Agree/Agree</i>	<i>Disagree/Strongly Disagree</i>	Consensus Achieved
Learner: Develop, integrate, and apply knowledge from the foundational sciences (i.e., pharmaceutical, social/behavioral/administrative, and clinical sciences) to evaluate the scientific literature, explain drug action, solve therapeutic problems, and advance population health and patient-centered care	<p>EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs.</p> <p>EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient,</p>	83.3%	12.5%	Yes

caregiver(s),
and other health
professionals
that are
evidence-based
and cost-
effective.

EPA:
Collaborate as a
member of an
IPE team.

EPA: Educate
patients and
professional
colleagues
regarding the
appropriate use
of medication.

EPA: Use
evidence-based
information to
advance patient
care.

The definition of patient care skills in Research Question One was: "Pharmacists must be able to perform basic patient care skills such as communication, collection and assessment of information to formulate and implement a treatment plan, and ability to monitor if a treatment is successful or not. Pharmacists need to ensure they take a patient's cultural, education level, and financial status into account when formulating a treatment plan to ensure a patient's plan can be adherent. Pharmacists also understand that part of patient care should include discussing the plan in a compassionate and empathetic manner with not only the patient but also their support system as needed." There were five competencies, each with various EPAs mapped to the Patient Care skills role. Consensus was achieved ($\geq 80\%$ *Strongly Agree/Agree*) on four of the five competencies/EPAs mapped to this role. The Educator competency was the one that did

not achieve consensus, with only 79.2% of respondents strongly agreeing/agreeing with this mapping. Comments from three respondents suggested that the EPAs related to implementation, identifying patients at risk, and immunizations did not fit here. Two respondents also suggested splitting Educator into a patient-focused competency and a health care professional focused competency. These suggestions were used to set-up the questions for the second-round survey. Overall, the competencies mapped under this role help to define the role of patient care skills. Except for some EPAs mapped under the Educator competency, the EPAs help define the actions needed to meet this role's competencies. While the competencies and EPAs mapped to this role are the same as ones mapped to later roles, in this case, they are specific to determine if a student was competent in this role. The issue is because these same competencies and EPAs occur in later roles, one would have a hard time determining which role was being assessed. There are also some competencies missing. There are no competencies related to the cultural and financial status of the patient. Table 8 shows the full results for this role.

Table 8

Competencies/EPAs Mapped to Patient Care Skills Role

Competency	EPAs	<i>Strongly Agree/ Agree</i>	<i>Disagree/ Strongly Disagree</i>	Consensus Achieved
Patient-centered care (Caregiver): Provide patient-centered care as the medication expert (collect and interpret evidence, prioritize, formulate assessments and	EPA: Collect information to identify a patient's medication-related problems and health-related needs. EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs.	95.8%	0%	Yes

recommendations, implement, monitor and adjust plans, and document activities).	<p>EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective.</p> <p>EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals.</p> <p>EPA: Follow-up and monitor a care plan.</p> <p>EPA: Maximize the appropriate use of medications in a population.</p> <p>EPA: Ensure that patients have been immunized against vaccine-preventable diseases.</p>			
Health and wellness (Promoter): Design prevention, intervention, and educational strategies for individuals and communities to manage chronic disease and improve health and wellness.	<p>EPA: Collect information to identify a patient's medication-related problems and health-related needs.</p> <p>EPA: Identify patients at risk for prevalent disease in a population.</p> <p>EPA: Minimize adverse drug events and medications in a population.</p> <p>EPA: Maximize the appropriate use of medications in a population.</p> <p>EPA: Ensure that patients have been immunized against vaccine-preventable diseases.</p>	87.5%	8.3%	Yes
Problem Solving (Problem Solver): Identify problems, explore and prioritize potential strategies, and design,	<p>EPA: Collect information to identify a patient's medication-related problems and health-related needs.</p> <p>EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems,</p>	87.5%	8.3%	Yes

implement, and evaluate a viable solution.	<p>and prioritize health-related needs.</p> <p>EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals.</p> <p>EPA: Collaborate as a member of an IPE team.</p> <p>EPA: Oversee the pharmacy operations for an assigned shift.</p> <p>EPA: Full-fill a medication order.</p>			
<p>Educator (Educator):</p> <p>Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.</p>	<p>EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals.</p> <p>EPA: Identify patients at risk for prevalent disease in a population.</p> <p>EPA: Minimize adverse drug events and medications in a population.</p> <p>EPA: Maximize the appropriate use of medications in a population.</p> <p>EPA: Ensure that patients have been immunized against vaccine-preventable diseases.</p> <p>EPA: Educate patients and professional colleagues regarding the appropriate use of medication.</p>	79.2%	16.7%	No
<p>Communication (Communicator):</p> <p>Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.</p>	<p>EPA: Collect information to identify a patient's medication-related problems and health-related needs.</p> <p>EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs.</p>	83.3%	16.7%	Yes

EPA: Follow-up and monitor a care plan.

EPA: Collaborate as a member of an IPE team.

EPA: Identify patients at risk for prevalent disease in a population.

EPA: Minimize adverse drug events and medications in a population.

EPA: Maximize the appropriate use of medications in a population.

EPA: Ensure that patients have been immunized against vaccine-preventable diseases.

EPA: Educate patients and professional colleagues regarding the appropriate use of medication.

EPA: Use evidence-based information to advance patient care.

EPA: Oversee the pharmacy operations for an assigned shift.

EPA: Full-fill a medication order.

As defined from Research Question One, the Professionalism role was: "Pharmacists are committed to the health and well-being of their patients, society, and themselves. Demonstration of this role occurs through ethical practice, high standards of personal behavior, accountability to the profession and society, and maintenance of their own personal health. Pharmacists serve essential roles in the healthcare team and society. As such, professional identity is central. This tenet includes promotion of the public good, adherence to high ethical and moral standards. It recognizes that to provide good quality patient care, they must take care of themselves and others in their profession." There

were four competencies, each with three EPAs mapped to the professionalism role. Consensus was achieved ($\geq 80\%$ *Strongly Agree/Agree*) on all five competencies/EPAs mapped to this role. The inclusion of this role did not occur in the second-round survey. Table 9 shows the full results for this role. The competencies mapped to this role met some of the items covered in this role's definition. Competencies are missing related to ethics and maintenance of personal health. While participants did feel the EPAs mapped to this role were appropriate, they again are not explicitly written for this role, so it is hard to see how achieving them as written would mean you have achieved this role. For example, “Overseeing the pharmacy operations for an assigned shift” is not clearly defined for how it assesses the competency of self-awareness in the context of the professionalism role. To help schools/colleges of pharmacy better address this EPA, the EPA needs to be more explicit.

Table 9

Competencies/EPAs Mapped to Professionalism Role

Competency	EPAs	<i>Strongly Agree/Agree</i>	<i>Disagree/Strongly Disagree</i>	Consensus Achieved
Self-awareness (Self-aware): Examine and reflect on personal knowledge, skills, abilities, beliefs, biases, motivation, and emotions that could enhance or limit personal and professional growth.	EPA: Collaborate as a member of an IPE team. EPA: Oversee the pharmacy operations for an assigned shift. EPA: Create a written plan for continuous professional development	91.7%	8.3%	Yes
Leadership (Leader): Demonstrate responsibility for	EPA: Collaborate as a member of an IPE team.	87.5%	8.3%	Yes

creating and achieving shared goals, regardless of position.	EPA: Educate patients and professional colleagues regarding the appropriate use of medication. EPA: Oversee the pharmacy operations for an assigned shift.			
Innovation and Entrepreneurship (Innovator): Engage in innovative activities by using creative thinking to envision better ways of accomplishing professional goals.	EPA: Collaborate as a member of an IPE team. EPA: Use evidence-based information to advance patient care. EPA: Oversee the pharmacy operations for an assigned shift.	83.3%	16.7%	Yes
Professionalism (Professional): Exhibit behaviors and values that are consistent with the trust given by the profession by patients, other healthcare providers, and society.	EPA: Collaborate as a member of an IPE team. EPA: Educate patients and professional colleagues regarding the appropriate use of medication. EPA: Oversee the pharmacy operations for an assigned shift. EPA: Create a written plan for continuous professional development	91.7%	8.3%	Yes

As defined in Research Question One, the scholarship role was: "Pharmacists are committed to excellence in their practice through life-long professional development, the teaching of others, developing new innovative practices that advance the profession, and use of evidence-based medicine. Pharmacists are committed to finding and promoting drug and other health information that is evidence-based and up-to-date. Pharmacists understand the importance of contributing to scholarship and evidence-based medical literature." There were three competencies mapped to the scholarship role. One

competency had six EPAs mapped to it, one had three, and one had two. Consensus was achieved ($\geq 80\%$ *Strongly Agree/Agree*) on all three competencies/EPAs mapped to this role. The inclusion of this role did not occur in the second-round survey. Table 10 shows the full results for this role. For the most part, the competencies mapped to this role cover all elements defined except for contributing to scholarship. There is no competency or EPA that discusses contributing to scholarship, only the use of it. Like the other roles, the competencies and EPAs mapped to this role are also not explicitly written for this role. Some tend to be very general, leaving it up to the school/college to determine how they would fit into this role.

Table 10

Competencies/EPAs Mapped to Scholarship Role

Competency	EPAs	<i>Strongly Agree/Agree</i>	<i>Disagree/Strongly Disagree</i>	Consensus Achieved
Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.	EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. EPA: Identify patients at risk for prevalent disease in a population. EPA: Minimize adverse drug events and medications in a population. EPA: Maximize the appropriate use of medications in a population. EPA: Ensure that patients have been immunized against vaccine-preventable diseases. EPA: Educate patients and professional colleagues regarding the appropriate use of medication.	83.3%	16.7%	Yes

Communication (Communicator): Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.	EPA: Educate patients and professional colleagues regarding the appropriate use of medication. EPA: Use evidence-based information to advance patient care.	95.8%	4.2%	Yes
Innovation and Entrepreneurship (Innovator): Engage in innovative activities by using creative thinking to envision better ways of accomplishing professional goals.	EPA: Collaborate as a member of an IPE team. EPA: Use evidence-based information to advance patient care. EPA: Oversee the pharmacy operations for an assigned shift.	83.3%	16.7%	Yes

The systems-based practice/manager role, as defined from Research Question One was: "Pharmacists are committed to safety and quality in health care, professional advocacy, health insurance, health care economics, health outcomes, quality improvement, transitions of care, public health, and chronic care of patients. Pharmacists understand that they work as part of a larger "system" of health care and that to provide excellent, quality care, they need to be able to coordinate care within the systems, provide treatment recommendations that work with the patients' insurance, and be an advocate for optimal and quality patient care. Pharmacists also need to be an advocate for the profession on professional roles/responsibilities and the ability to bill for services." There were four competencies with a variety of EPAs mapped to the systems-based

practice/manager role. Consensus was achieved ($\geq 80\%$ *Strongly Agree/Agree*) on three of the four competencies/EPAs mapped to this role. Again, the Educator competency did not reach consensus, with only 79.2% of respondents *Strongly Agreeing/Agreeing* to the mapping to this role. Two respondents commented immunizations and identifying at-risk patients did not fit under this role. These suggestions were taken into account when the rewording of this mapping for the second-round survey. Table 11 shows the full results for this role. The competencies and EPAs mapped to this role are again very general. While they do fit under this role, they are not specific for the role, and some competencies are missing. For example, the Manager's competency is written to fit the broad healthcare system-based intent of this role. However, the EPAs underneath it is written to be at the patient level and not at the system level. The EPAs would need to be adjusted to assess competency for this role better. There are also competencies and EPAs missing. There are no competencies or EPAs related to professional advocacy (not advocating for the good of the patient but advocating for the good of the profession and its place in healthcare), health outcomes, quality improvement, transitions of care, and public health.

Table 11

Competencies/EPAs Mapped to Systems-based Practice/Manager Role

Competency	EPAs	<i>Strongly Agree/Agree</i>	<i>Disagree/Strongly Disagree</i>	Consensus Achieved
Medication use systems management (Manager): Manage patient healthcare needs using human, financial,	EPA: Collect information to identify a patient's medication-related problems and health-related needs. EPA: Establish patient-centered goals and create a	83.3%	16.7%	Yes

technological, and physical resources to optimize the safety and efficacy of medication use.	<p>care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective.</p> <p>EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals.</p> <p>EPA: Follow-up and monitor a care plan.</p> <p>EPA: Identify patients at risk for prevalent disease in a population.</p> <p>EPA: Minimize adverse drug events and medications in a population.</p> <p>EPA: Maximize the appropriate use of medications in a population.</p> <p>EPA: Ensure that patients have been immunized against vaccine-preventable diseases.</p> <p>EPA: Oversee the pharmacy operations for an assigned shift.</p> <p>EPA: Full-fill a medication order.</p>			
Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.	<p>EPA: Identify patients at risk for prevalent disease in a population.</p> <p>EPA: Minimize adverse drug events and medications in a population.</p> <p>EPA: Maximize the appropriate use of medications in a population.</p> <p>EPA: Ensure that patients have been immunized</p>	79.2%	16.7%	No

	against vaccine-preventable diseases. EPA: Educate patients and professional colleagues regarding the appropriate use of medication.			
Communication (Communicator): Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.	EPA: Oversee the pharmacy operations for an assigned shift. EPA: Full-fill a medication order.	91.7%	4.2%	Yes
Leadership (Leader): Demonstrate responsibility for creating and achieving shared goals, regardless of position.	EPA: Collaborate as a member of an IPE team. EPA: Educate patients and professional colleagues regarding the appropriate use of medication. EPA: Oversee the pharmacy operations for an assigned shift.	91.7%	8.3%	Yes

As defined in Research Question One, the collaborator role was: "Pharmacists work with other healthcare professionals to provide safe, high-quality, evidence-based, and patient-centered care. Pharmacists understand that being able to function effectively in an interprofessional team is necessary to provide safe, high-quality, and patient-centered care. Collaboration is also important with the patient and their support systems. Collaboration requires trust, respect, and shared decision-making. It also requires the sharing of knowledge, perspectives, responsibilities, and the willingness to learn from others. To effectively collaborate, one must understand the roles of others on the team, be able to articulate one's role on the team, be pursuing common goals, and be able to

manage conflict effectively." There were four competencies with a variety of EPAs mapped to the collaborator role. Consensus was achieved ($\geq 80\%$ *Strongly Agree/Agree*) on all four competencies/EPAs mapped to this role. This role did not need to be included in the second round Delphi survey. Table 12 shows the full results for this role. Overall the competencies under this role fit; however, just as with the other roles, the competencies/EPAs are general. The competencies and EPAs are not written to precisely match this role, and many of the EPAs fit under more than one competency. For example, if a student did not meet the EPA of "Collaborate as a member of an IPE team," which competency is meeting it for, Problem Solver, Collaborator, or Communicator. There is also no competency or EPA related to conflict management.

Table 12

Competencies/EPAs Mapped to Collaborator Role

Competency	EPAs	<i>Strongly Agree/Agree</i>	<i>Disagree/Strongly Disagree</i>	Consensus Achieved
Problem Solving (Problem Solver): Identify problems, explore and prioritize potential strategies, and design, implement, and evaluate a viable solution.	EPA: Collaborate as a member of an IPE team.	87.5%	12.5%	Yes
Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.	EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. EPA: Educate patients and professional colleagues regarding the appropriate use of medication.	91.7%	4.2%	Yes

Interprofessional collaboration (Collaborator): Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs.	EPA: Follow-up and monitor a care plan. EPA: Collaborate as a member of an IPE team. EPA: Identify patients at risk for prevalent disease in a population. EPA: Minimize adverse drug events and medications in a population. EPA: Maximize the appropriate use of medications in a population. EPA: Ensure that patients have been immunized against vaccine-preventable diseases.	91.7%	8.3%	Yes
Communication (Communicator): Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.	EPA: Collaborate as a member of an IPE team. EPA: Educate patients and professional colleagues regarding the appropriate use of medication.	95.8%	4.2%	Yes

The advocate/health promoter role, as defined in Research Question One, was:

"Pharmacists are committed to using their expertise and influence to work with patient populations to improve health and wellness in communities. They work to understand the needs, speak on behalf of others, and seek to mobilize resources to effect change when needed. Pharmacists understand that improving health is not limited to treating illness but also includes disease prevention, health promotion, and health protection. They understand their unique place in the healthcare team, and society allows them access to

populations that others may not have. Pharmacists understand the need to work with patients to help them navigate complex medical situations to get the care they may need." There were four competencies with a variety of EPAs mapped to the advocate/health promoter role. Consensus was achieved ($\geq 80\%$ *Strongly Agree/Agree*) on all four competencies/EPAs mapped to this role. This role did not need to be included in the second round Delphi survey. Table 13 shows the full results for this role. The competencies mapped to this role are consistent with the intent of this role. However, just like the previous roles, the competencies and EPAs are not specific for this role, leaving it up to the schools/colleges of pharmacy to define the competency/EPAs' intent.

Table 13

Competencies/EPAs Mapped to Advocate/Health Promoter Role

Competency	EPAs	<i>Strongly Agree/Agree</i>	<i>Disagree/Strongly Disagree</i>	Consensus Achieved
Population-based care (Provider): Describe how population-based care influences patient-centered care and influences the development of practice guidelines and evidence-based best practices.	EPA: Identify patients at risk for prevalent disease in a population. EPA: Minimize adverse drug events and medications in a population. EPA: Maximize the appropriate use of medications in a population. EPA: Ensure that patients have been immunized against vaccine-preventable diseases.	91.7%	4.2%	Yes
Educator (Educator): Educate all audiences by determining the	EPA: Identify patients at risk for prevalent disease in a population.	87.5%	8.3%	Yes

most effective and enduring ways to impart information and assess understanding.	<p>EPA: Minimize adverse drug events and medications in a population.</p> <p>EPA: Maximize the appropriate use of medications in a population.</p> <p>EPA: Ensure that patients have been immunized against vaccine-preventable diseases.</p> <p>EPA: Educate patients and professional colleagues regarding the appropriate use of medication.</p>			
Patient Advocacy (Advocate): Assure that patients' best interests are represented.	<p>EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective.</p> <p>EPA: Collaborate as a member of an IPE team.</p> <p>EPA: Minimize adverse drug events and medications in a population.</p> <p>EPA: Maximize the appropriate use of medications in a population.</p> <p>EPA: Ensure that patients have been immunized against vaccine-preventable diseases.</p> <p>EPA: Educate patients and professional colleagues regarding the appropriate use of medication.</p>	91.7%	8.3%	Yes

Cultural sensitivity (Includer): Recognize social determinants of health to diminish disparities and inequities in access to quality care.	EPA: Collect information to identify a patient's medication-related problems and health-related needs. EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective. EPA: Identify patients at risk for prevalent disease in a population. EPA: Minimize adverse drug events and medications in a population. EPA: Maximize the appropriate use of medications in a population. EPA: Ensure that patients have been immunized against vaccine-preventable diseases. EPA: Educate patients and professional colleagues regarding the appropriate use of medication. EPA: Use evidence-based information to advance patient care.	91.7%	4.2%	Yes
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After round one of the Delphi survey, two of the roles, patient care skills and systems-based practice/manager, had competencies/EPAs that did not reach consensus (2 competencies/EPA mappings out of 25 [8%]). For round two of the Delphi survey, participants were asked for consensus on updated mapping for these two roles. For patient care skills, splitting of the educator competency into two competencies occurred. One competency defined education for patients: "Educate patients and their caregivers by determining the most effective and enduring ways to impart information and assess

understanding." The other competency defined Healthcare professional education: "Educate healthcare providers by determining the most effective and enduring ways to impart information and assess understanding.". Both competencies had the same three EPAs mapped to them related to minimizing adverse effects, maximizing the appropriate use of medications, and providing education. For systems-based practice/manager, removing the EPAs related to immunizations and identifying patients at risk occurred, but rewording of the competency itself did not occur. These updated competency/EPA mappings, along with the changes made to the survey upon review of the data for Research Question Three, formed the round two Delphi survey. The same group of participants as round one received the updated survey.

Round Two. The second round of the Delphi survey followed the same survey procedure as round one, except questions were only asked on items that did not meet consensus during round one (2 competencies/EPA mappings out of 25 [8%]). The same participant group was used as round one. The second round Delphi survey had a total of 19 participants respond (30.2% response rate). Six (31.6%) of the respondents had >20 years of experience, five (9%) had 11-20 years of experience, seven (36.8%) had 5-10 years of experience, zero (80%) had <5 years of experience, and one preferred not to answer (5.3%). Six (31.6%) respondents were male, 11 (58.0%) were female, and two (10.5%) preferred not to answer. Fifteen (78.9%) had practice sites in urban locations, three (15.8%) had rural practice sites, and one (5.3%) preferred not to answer. One (5.3%) respondent was an acute care pharmacist, nine (47.4%) were ambulatory care pharmacists, two (10.5%) were community pharmacists, two (10.5%) were in

academia, two (10.5%) were hospital pharmacists, two (10.5%) were in management, and one (5.2%) preferred not to answer.

Under the patient care skills role, the Educator competency did not meet consensus during round one. Comments from respondents suggested that the EPAs related to implementation, identifying patients at risk, and immunizations did not fit under this competency for this role. Removal of these EPAs occurred from the question for this round. Respondents also suggested splitting the Educator competency for this role into two competencies, one related to healthcare professionals and one for patients. For round two, the division of this competency into Patient Educator and Healthcare Professional Educator occurred. Patient Educator's definition was "educating patients and their caregivers by determining the most effective and enduring ways to impart information and assess understanding." This competency then had three EPAs mapped to it. The definition of Healthcare Professional Educator was "educating healthcare providers by determining the most effective and enduring ways to impart information and assess understanding." This competency also had three EPAs mapped to it. Consensus was achieved ($\geq 80\%$ *Strongly Agree/Agree*) for all the mapping to this role, so this role's inclusion in the round three survey did not occur. The results are below in Table 14. The changes made based on the participants' feedback after round one did not address the issues discussed related to this mapping after round one. The competencies and EPAs are still very general and map to multiple roles. Even with splitting the Educator competency into two parts, the patient educator's coverage occurs in multiple roles, and the EPAs mapped are still not specific for this particular role. There was also no suggestion to add

competencies related to the patient's cultural and financial status, which would be needed to assess this role adequately.

Table 14

Updated Competencies/EPAs Mapped to Patient Care Skills Role

Competency	EPAs	<i>Strongly Agree/ Agree</i>	<i>Disagree/ Strongly Disagree</i>	Consensus Achieved
Patient Educator (Educator): Educate patients and their caregivers by determining the most effective and enduring ways to impart information and assess understanding.	EPA: Minimize adverse drug events and medications in a population. EPA: Maximize the appropriate use of medications in a population. EPA: Educate patients and caregivers regarding the appropriate use of medication	100%	0%	Yes
Healthcare professional Educator (Educator): Educate healthcare providers by determining the most effective and enduring ways to impart information and assess understanding.	EPA: Minimize adverse drug events and medications in a population. EPA: Maximize the appropriate use of medications in a population. EPA: Educate professional colleagues regarding the appropriate use of medication.	94.7%	5.3%	Yes

Systems-based practice/manager had one competency not meet consensus during round one. Respondents in round one did not feel immunizations and identifying at-risk patients fit under this role. For the round two survey questions related to this competency, removing the EPAs related to immunizations and identifying at-risk patients occurred. Consensus was achieved ($\geq 80\%$ *Strongly Agree/Agree*) for the mapping to this role, so

this role's inclusion did not occur in the round three survey. The results are below in Table 15. These changes still did not address the issues discussed after round one related to this role. The competencies and EPAs are still not written to match this role precisely and many of the EPAs fit under more than one competency. There is also still no competency or EPA related to conflict management.

Table 15

Updated Competencies/EPAs Mapped to Systems-based Practice/Manager Role

Competency	EPAs	<i>Strongly Agree/ Agree</i>	<i>Disagree/ Strongly Disagree</i>	Consensus Achieved
Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.	<ul style="list-style-type: none"> • EPA: Minimize adverse drug events and medications in a population. • EPA: Maximize the appropriate use of medications in a population. • EPA: Educate patients and professional colleagues regarding the appropriate use of medication. 	94.7%	5.3%	Yes

After round two of the Delphi survey, all competencies and EPAs mapped to the core roles developed in Research Question One met consensus. Since all competency and EPA mapping met consensus, there was no need for a round three survey for Research Question Two. Research Question Two asked the following: According to pharmacy practitioners, what is the alignment of the current pharmacy competencies and entrustable professional activities (EPAs) to the core professional roles? Appendix F shows the alignment of the current pharmacy competencies and EPAs to the core professional roles

developed in Research Question One. The average number of competencies under each role was 4 (1-6), with the most in the patient care skills role. The average number of EPAs mapped to each role was 17 (5-36), with patient care skills having the most EPAs. The pharmacy roles developed in Research Question One are distinct and meant to stand alone. However, the competencies and EPAs mapped to these roles are duplicative across roles, as discussed previously. This duplication makes it hard for schools/colleges of pharmacy to know for sure which role a student is competent in just by meeting the competency/EPA as written.

The core role of knowledge had one competency, Learner, mapped to it along with five EPAs. There were no missing competencies for this role. However, separation of the mapped competency into more specific competencies related to the role would help determine a student's real areas of weakness. The patient care skills role had five competencies mapped to it: Caregiver, Promoter, Problem Solver, Educator, and Communicator. One pharmacy competency change occurred with the mapping to this role. Delphi participants felt the Educator competency needed divided into patient education and healthcare professional education for this role, given the importance of education in patient care skills. The competencies had 3-12 EPAs mapped to them with Communicator having the most. Two competencies are missing related to the cultural and financial status of the patient for this role.

The professionalism role had four competencies mapped to it: Self-aware, Leader, Innovator, and Professional. Each competency has 3-4 EPAs mapped to it with Professional having the most. No competencies or EPAs were missing, but the competencies and EPAs are very general. Scholarship has three competencies mapped to

it: Educator, Communication, and Innovator. Each competency has 2-6 EPAs mapped to it with Educator having the most. Competencies are missing for this role related to ethics and maintenance of personal health. Systems-based practice/manager had four competencies mapped: Manager, Educator, Communicator, and Leader. Each competency had 3-10 EPAs mapped to them, with Manager having the most EPAs. The systems-based practice/manager role had several competencies missing. There are no competencies or EPAs related to professional advocacy (not advocating for the good of the patient but advocating for the good of the profession and its place in healthcare), health outcomes, quality improvement, transitions of care, and public health.

Collaborator had four competencies mapped: Problem Solver, Educator, Collaborator, and Communicator. Each competency had 1-6 EPAs mapped to it, with Collaborator having the most. The collaborator role was missing a competency and/or EPA(s) related to conflict management. Lastly, advocate/health promoter had four competencies mapped to it: Provider, Educator, Advocate, and Includer. Each competency had 4-8 EPAs mapped to it, with Includer having the most. No competencies were missing for this role.

Mapping of all current pharmacy competencies and EPAs to the core roles from Research Question One occurred with no changes occurring in the wording of the EPAs or the addition of any EPAs (with exception of splitting one EPA for one competency). The lack of changes or additions to the already developed EPAs from AACCP meant a baseline level of entrustment that could form the first Delphi survey for Research Question Three. The purpose of Research Question Three was to obtain a consensus on

the level of entrustment that students should achieve by graduation for each of the EPAs mapped to the pharmacy competencies.

Research Question Three

Research Question Three was: According to pharmacy practitioners, what level of entrustment should pharmacy graduates be expected to achieve for each EPA? This research question used the same Delphi technique as research question two to simultaneously collect quantitative and qualitative data (Delbecq et al., 1975). Like the NGT process, the Delphi technique offered a framework for gathering stakeholder data on topics that call for aggregation of individual judgments such as Research Question Three. Research Question Three sought to examine if there was a broad consensus from different pharmacy practices on the entrustment level (Research Question Three) assigned to the EPAs from the mapping for Research Question Two.

There were five levels of entrustment defined for this survey. Specifically, Level 1 entrustment suggests a student can observe but not complete a task (e.g., a student may observe but not do a patient's medication history). Level 2 is execution with direct and proactive supervision (e.g., student will perform the medication history with the pharmacist in the room providing advice). Level 3 is performance with quickly available (reactive) supervision (e.g., the student will perform the medication history alone with the pharmacist in the next room should help be needed). Level 4 is execution with supervision from a distance or when asked for by the student (e.g., a student can be freely trusted to perform the history without any help). Level 5 is the ability to teach someone else the skill (ten Cate, 2013).

Questions related to the levels of entrustment a student should achieve upon graduation were devised for each of the AACP EPA statements. The level of entrustment

chosen as the starting point for round one was a Level 3 (performance with quickly available [reactive] supervision). This level of entrustment was chosen to be in-line with the recommendations from the AACP Academic Affairs Standing Committee, who developed the EPAs (Jarrett et al., 2018). For example, participants were presented with an EPA with a level of entrustment: “Collect information to identify a patient’s medication-related problems and health-related needs (Level 3).” Participants were then asked to report their level of agreement with the alignment of that level of entrustment for that EPA on a four-point Likert scale (1 = *Strongly Disagree* to 4= *Strongly Agree*) similar to Research Question Two. For round one, participants were also given a fifth option of choosing "depends on the role." The "depends on the role" would indicate that respondents felt the level of entrustment would change depending on the EPA's role mapping. Removal of this option occurred for rounds two and three.

Round One. Just as for Research Question Two, aggregation of the results from the selected-response (Likert scale) questions into three categories occurred for Round One: Category 1 - *Strongly Agree/Agree*, Category 2 – *Disagree/ Strongly Disagree*, and Category 3 – “depends on the role” from each panelist's response to determine if consensus was achieved. Rounds two and three only used Category 1 and Category 2 for aggregation. Computation of the percent number of responses for each category then occurred for each question. For example, if 50 participants completed the survey with 30 indicating *Strongly Agree* and ten indicating *Agree* for a question, then the percent response for Category 1 (*Strongly Agree/Agree*) would be 80%. For there to be consensus on the competency/EPA alignment, there had to be a category score of $\geq 80\%$ *Strongly Agree/Agree* for the question. A review of constructed-response comments occurred for

any question that did not achieve consensus ($\geq 80\%$ agreement) using structural coding via NiViVo software (NiViVo qualitative data analysis software, 2019). Once a mapping reached consensus ($\geq 80\%$ *Strongly Agree/Agree*), it was no longer included in subsequent round surveys.

The questions related to the EPA levels of entrustment were included in the same round one survey as Research Question Two. Participants did not have to complete both sections of the survey to have their data included. The first round Delphi survey for Research Question Three had a total of 21 participants respond (33.3% response rate). Five (23.8%) of the respondents had >20 years of experience, seven (33.3%) had 11-20 years of experience, seven (33.3%) had 5-10 years of experience, and two (9.5%) had <5 years of experience. Eight (38.1%) of respondents were male, and 13 (61.9%) were female. Fifteen (71.4%) of respondents have practice sites in urban settings and six (28.6) practice in rural settings. Five (23.8%) respondents were acute care pharmacists, eight (38.1%) were ambulatory care pharmacists, four (19.0%) were community pharmacists, two (9.5%) were in academia, and two (9.5%) were in other types of practice.

Of the fifteen EPAs, only four achieved consensus for students to meet a Level 3 (performance with quickly available [reactive] supervision) of entrustment upon graduation after the first round Delphi survey. Respondents did not feel the four EPAs that achieved consensus had a different level of entrustment depending on the role mapping. For the remaining eleven EPAs, respondents felt the level of entrustment would vary depending on the role mapping from Research Question Two (Appendix F). Respondents also felt that students should meet higher levels of entrustment for two of the EPAs upon graduation. These EPAs were "Collect information to identify a patient's

medication-related problems and health-related needs" and "Educate patients and professional colleagues regarding the appropriate use of medication." Respondents felt that students should meet a Level 4 (execution with supervision from a distance or when asked for by the student) for entrustment upon graduation for these EPAs. For six of the EPAs, respondents felt the level of entrustment should be less than 3 upon graduation. For these six EPAs, respondents felt students should only achieve a Level 2 (execution with direct and proactive supervision) upon graduation. Table 16 shows the full results. The other comment that was constant for all the EPAs is the respondents were not sure where in the curriculum students were being assessed.

Table 16

EPAs with Level of Entrustment

EPAs	<i>Strongly Agree/ Agree</i>	<i>Disagree/ Strongly Disagree</i>	<i>Depends on Role</i>	<i>Consensus Achieved</i>
Collect information to identify a patient's medication-related problems and health-related needs. (Level 3)	72.7%	4.5	22.7%	No
Analyze information to determine the effects of medication therapy, identify medication-related problem, and prioritize health-related needs.	70%	5%	25%	No
Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective. (Level 3)	71.4%	4.8%	23.8%	No
Implement a care plan in collaboration with the patient, caregivers, and other health professionals. (Level 3)	71.4%	14.3%	14.3%	No

Follow-up and monitor a care plan. (Level 3)	81.0%	4.8%	14.3%	Yes
Collaborate as a member of an IPE team. (Level 3)	81.0%	0%	19.0%	Yes
Identify patients at risk for prevalent disease in a population. (Level 3)	85.7%	0%	14.3%	Yes
Minimize adverse drug events and medications in a population. (Level 3)	71.4%	4.8%	23.8%	No
Maximize the appropriate use of medications in a population. (Level 3)	76.2%	9.5%	14.3%	No
Ensure that patients have been immunized against vaccine-preventable diseases. (Level 3)	95.2%	0%	4.8%	Yes
Educate patients and professional colleagues regarding the appropriate use of medication. (Level 3)	76.2%	0%	23.8%	No
Use evidence-based information to advance patient care. (Level 3)	76.2%	0%	23.8%	No
Oversee the pharmacy operations for an assigned shift. (Level 3)	38.1%	33.3%	28.6%	No
Full-fill a medication order. (Level 3)	71.4%	9.5%	19.0%	No
Create a written plan for continuous professional development. (Level 3)	76.2%	9.5%	14.3%	No

Based on the first round of the Delphi survey for Research Question Three, respondents were unsure where in the curriculum students were being assessed and felt that most of the EPAs' level of entrustment depended on the role mapping. For the second round Delphi survey, directions to the respondents were made more explicit that entrustment levels are being assigned based on students at graduation (in their final rotation). The survey for round two asked respondents whether they agree with the EPAs'

levels of entrustment based on their role mapping. Levels of entrustment were also adjusted up or down based on participants' comments. The combination of this updated survey and changes from Research Question Two was sent to the same group of participants as the round one survey.

Round Two. The second round of the Delphi survey followed the same survey procedure as round one, except questions were only asked on items that did not meet consensus during round one (11/15 [73.3%] did not meet consensus). The same participant group was used as round one as well. The second round Delphi survey had a total of 18 participants respond (28.6% response rate). Six (33.3%) of the respondents had >20 years of experience, five (27.8%) had 11-20 years of experience, seven (38.9%) had 5-10 years of experience, and zero (0%) had <5 years of experience. Six (33.3%) respondents were male, 11 (61.1%) were female, and one (5.6%) preferred not to answer. Fifteen (83.3%) had practice sites in urban locations, and three (16.7%) had rural practice sites. One (5.6%) respondent was an acute care pharmacist, nine (50%) were ambulatory care pharmacists, two (11.1%) were community pharmacists, two (11.1%) were in academia, two (11.1%) were hospital pharmacists, and two (11.1%) were in management.

Usage of the same five levels of entrustment occurred for this survey as in Round One. Level 1 entrustment suggests a student can observe but not complete a task (e.g., a student may observe but not do a medication history on a patient). Level 2 is execution with direct and proactive supervision (e.g., student will perform the medication history with the pharmacist in the room providing advice). Level 3 is performance with quickly available (reactive) supervision (e.g., the student will perform the medication history alone with the pharmacist in the next room should help be needed). Level 4 is execution

with supervision from a distance or when asked for by the student (e.g., a student can be freely trusted to perform the history without any help). Level 5 is the ability to teach someone else the skill (ten Cate, 2013).

Per the results from round one, EPA mapping to the core roles with levels of entrustment provided by the participants' comments occurred. The knowledge role had five EPAs mapped to it all with Level 3 entrustment (performance with quickly available [reactive] supervision). Consensus was achieved (>80% *Strongly Agree/Agree*) for the mapping to this role, so the inclusion of these EPAs was not needed in the round three survey. The results are below in Table 17. Participants felt that students should have the knowledge related to each of the EPA statements and should be trusted to discuss this knowledge with minor involvement of the preceptor. The only issue is that the EPAs listed under this role do not cover all the knowledge components required to be competent in this role adequately.

Table 17

EPAs with Level of Entrustment for the Knowledge Role

EPAs	<i>Strongly Agree/Agree</i>	<i>Disagree/Strongly Disagree</i>	Consensus Achieved
EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs. (Level 3)	88.9%	11.1%	Yes
EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective. (Level 3)	94.4%	5.6%	Yes

EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 3)	88.9%	11.1%	Yes
EPA: Use evidence-based information to advance patient care. (Level 3)	94.4%	5.6%	Yes

The patient care skills role has ten EPAs mapped to it. Nine of the ten EPAs achieved consensus ($\geq 80\%$ *Strongly Agree/Agree*) after round two. The inclusion of these nine EPAs did not occur in the round three Delphi survey. One EPA, “Implement a care plan in collaboration with the patient, caregivers, and other healthcare professionals,” did not achieve consensus at an entrustment level 2 (execution with direct and proactive supervision). Delphi participants felt this EPA should be at least a Level 3 (performance with quickly available [reactive] supervision) at graduation. Table 18 contains the survey results for this role. Participants felt that four of the EPAs related to analyzing information from patients, establishing patient-centered goals, full-filling medication orders, and using evidence-based information students should achieve a Level 3 (performance with quickly available [reactive] supervision) at graduation. Participants felt that the ability to collect information from patients should be at a Level 4 (execution with supervision from a distance or asked for by the student). Lastly, three of the EPAs related to maximizing medication use in a population, minimizing adverse drug events, and overseeing pharmacy operations, participants felt students should achieve a Level 2 (execution with direct and proactive supervision) upon graduation. Overall the EPAs mapped to this role match well with the competencies mapped and the role itself, except for Educator, which had EPAs which were not role-specific. The problem is that the

EPAs are not specific for only this role, so how is a school/college to know if the student is achieving this role when meeting the EPA or another role?

Table 18

EPAs with Level of Entrustment for the Patient Care Skills Role

EPAs	<i>Strongly Agree/ Agree</i>	<i>Disagree/ Strongly Disagree</i>	Consensus Achieved
EPA: Collect information to identify a patient's medication-related problems and health-related needs. (Level 4)	94.4%	5.6%	Yes
EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs. (Level 3)	88.9%	11.1%	Yes
EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective. (Level 3)	94.4%	5.6%	Yes
EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. (Level 2)	66.7%	33.3%	No
EPA: Maximize the appropriate use of medications in a population. (Level 2)	94.4%	5.6%	Yes
EPA: Minimize adverse drug events and medications in a population. (Level 2)	94.4%	5.6%	Yes
EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)	100%	0%	Yes
EPA: Full-fill a medication order. (Level 3)	88.9%	11.1%	Yes
EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)	88.2%	11.8%	Yes

Use evidence-based information to advance patient care. (Level 3)	88.9%	11.1%	Yes
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The professionalism role has four EPAs mapped to it with levels of entrustment ranging from 2-4. All ten EPAs achieved consensus ($\geq 80\%$ *Strongly Agree/Agree*) after round two. The inclusion of these EPAs did not occur in round three of the Delphi survey. Table 19 contains the survey results for this role. Participants felt that students should achieve an entrustment level of 2 upon graduation (execution with direct and proactive supervision) for the EPA related to overseeing pharmacy operations. Students should achieve an entrustment level of 3 (performance with quickly available [reactive] supervision) for items related to developing plans for professional development and using evidence-based medicine. Lastly, students should achieve an entrustment level of 4 (execution with supervision from a distance or when asked by the student) to educate patients and colleagues. The EPAs mapped to this role are not specific for the definitions and competencies mapped for this role. The lack of specificity means that schools/colleges will need to further define these for themselves to know if students are achieving this role.

Table 19

EPAs with Level of Entrustment for the Professionalism Role

EPAs	<i>Strongly Agree/Agree</i>	<i>Disagree/Strongly Disagree</i>	Consensus Achieved
EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)	100%	0%	Yes
EPA: Create a written plan for continuous professional development (Level 3)	100%	0%	Yes

EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)	83.3%	16.7%	Yes
EPA: Use evidence-based information to advance patient care. (Level 3)	88.9%	11.1%	Yes

The scholarship role had six EPAs mapped to it with levels of entrustment ranging from 2-4. Four of the EPAs achieved consensus ($\geq 80\%$ *Strongly Agree/Agree*) after round two with entrustment levels from 2-4. The inclusion of these EPAs did not occur in round three of the Delphi survey. The two EPAs that met consensus were related to minimizing adverse drug events and maximizing medication use in the population. Participants felt that students should achieve an entrustment level of 2 (execution with direct and proactive supervision) upon graduation. Two of the EPAs did not achieve consensus. The EPA “Implement a care plan in collaboration with the patient, caregivers, and other health professionals” did not achieve consensus at a Level 2 (execution with direct and proactive supervision). Participants felt this EPA should be at least a Level 3 (performance with quickly available [reactive] supervision). The EPA “Educate patients and professional colleagues regarding the appropriate use of medication” did not achieve consensus at a Level 4 (execution with supervision from a distance or when asked for by the student). Participants felt this EPA should be a Level 3 [performance with quickly available (reactive) supervision], a different level of attainment than in other roles. Some participants mentioned that maybe this EPA should not be under this role. The EPA was left, however, because it reached consensus under Research Question 2. The inclusion of these two EPAs occurred in the round three Delphi Survey. Table 20 contains the survey results. Just as discussed in previous roles, while these EPAs do somewhat fit this role,

they are not explicitly written for this role, making it hard to know which role the student is achieving.

Table 20

EPAs with Level of Entrustment for the Scholarship Role

EPAs	<i>Strongly Agree/ Agree</i>	<i>Disagree/ Strongly Disagree</i>	Consensus Achieved
EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. (Level 2)	61.1%	38.9%	No
EPA: Minimize adverse drug events and medications in a population. (Level 2)	83.3%	16.7%	Yes
EPA: Maximize the appropriate use of medications in a population. (Level 2)	83.3%	16.7%	Yes
EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)	77.8%	22.2%	No
EPA: Use evidence-based information to advance patient care. (Level 3)	88.9%	11.1%	Yes
EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)	88.9%	11.1%	Yes

The systems-based/practice manager role had eight EPAs mapped to it with entrustment levels ranging from 2-4. All ten EPAs achieved consensus ($\geq 80\%$ *Strongly Agree/Agree*) after round two. The inclusion of these EPAs did not occur in round three of the Delphi survey. Table 21 contains the survey results for this role. Participants felt that students should achieve an entrustment level 2 (execution with direct and proactive supervision) for EPAs to minimize adverse drug events, maximize the appropriate use of medications, and oversee pharmacy operations. Students should achieve an entrustment level 3 (performance with quickly available [reactive] supervision) for items related to

establishing patient-centered goals and care plans, implementing care plans, and full-filling medication orders. Lastly, students should achieve an entrustment level of 4 (execution with supervision from a distance or when asked by the student) for EPAs related to collecting patient information and educating patients and colleagues. These EPAs' entrustment levels are the same as those seen for previous roles for these EPAs. While these EPAs do fit under this role, they are written more at the patient level than at the broader systems-level leaving it to the school/college to define attainment for themselves. There are also no EPAs related to professional advocacy (not advocating for the good of the patient but advocating for the good of the profession and its place in healthcare), health outcomes, quality improvement, transitions of care, and public health.

Table 21

EPAs with Level of Entrustment for the Systems-based/Practice Manager Role

EPAs	<i>Strongly Agree/ Agree</i>	<i>Disagree/ Strongly Disagree</i>	Consensus Achieved
EPA: Collect information to identify a patient's medication-related problems and health-related needs. (Level 4)	94.4%	5.6%	Yes
EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective. (Level 3)	88.9%	11.1%	Yes
EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. (Level 3)	88.9%	11.1%	Yes
EPA: Minimize adverse drug events and medications in a population. (Level 2)	94.4%	5.6%	Yes
EPA: Maximize the appropriate use of medications in a population. (Level 2)	94.4%	5.6%	Yes

EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)	100%	0%	Yes
EPA: Full-fill a medication order. (Level 3)	83.3%	16.7%	Yes
EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)	88.9%	11.1%	Yes

The collaborator role had four EPAs mapped to it with levels of entrustment ranging from 2-4. Three of the EPA achieved consensus ($\geq 80\%$ *Strongly Agree/Agree*) after round two with entrustment levels from 2-4. The inclusion of these EPAs did not occur in round three of the Delphi survey. Participants felt that students should achieve entrustment levels of 2 (execution with direct and proactive supervision) for EPAs related to minimizing adverse drug events and maximizing the appropriate use of medications. Students should achieve an entrustment level of 4 (execution with supervision from a distance or when asked for by the student) for the EPA related to educating patients. These entrustment levels are the same as other roles to which these EPAs are mapped. One of the EPAs did not achieve consensus: “Implement a care plan in collaboration with the patient, caregivers, and other health professionals” at a Level of 2 (execution with direct and proactive supervision). Participants felt this EPA should be at least a Level 3 (performance with quickly available [reactive] supervision). The inclusion of this EPA did occur in the round three Delphi Survey. Table 22 contains the survey results and comments for this role. Like the other roles, the EPAs mapped to this role do fit, but they are not role-specific, leaving it up to schools/colleges of pharmacy to further define. There is also no EPA related to conflict management.

Table 22

EPAs with Level of Entrustment for the Collaborator Role

EPAs	<i>Strongly Agree/ Agree</i>	<i>Disagree/ Strongly Disagree</i>	Consensus Achieved
EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. (Level 2)	72.2%	27.8%	No
EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)	83.3%	16.7%	Yes
EPA: Minimize adverse drug events and medications in a population. (Level 2)	94.4%	5.6%	Yes
EPA: Maximize the appropriate use of medications in a population. (Level 2)	94.4%	5.6%	Yes

The advocate/health promoter role has six EPAs mapped to it with entrustment levels ranging from 2-4. All six EPAs achieved consensus ($\geq 80\%$ *Strongly agree/Agree*) after round two. The inclusion of these EPAs did not occur in round three of the Delphi survey. Table 23 contains the survey results for this role. Participants felt that students should achieve an entrustment level of 2 (execution with direct and proactive supervision) for EPAs to minimize adverse drug events and maximize appropriate medication use. Students should achieve an entrustment Level 3 (performance with quickly available [reactive] supervision) for EPAs to establish patient-centered goals and use evidence-based medicine. Lastly, students should achieve an entrustment Level 4 (execution with supervision from a distance or when asked by the student) for EPAs related to educating patients/colleagues and collecting patient information. These levels of entrustment are the same as recommended for previous roles to which these EPAs were mapped. Once again, these EPAs do fit under this role, but they are not role-specific, leaving schools/colleges to define the EPA further.

Table 23

EPAs with Level of Entrustment for the Advocate/Health Promotor Role

EPAs	Strongly Agree/ Agree	Disagree/ Strongly Disagree	Consensus Achieved
EPA: Minimize adverse drug events and medications in a population. (Level 2)	94.4%	5.6%	Yes
EPA: Maximize the appropriate use of medications in a population. (Level 2)	94.4%	5.6%	Yes
EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)	88.9%	11.1%	Yes
EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective. (Level 3)	88.9%	11.1%	Yes
EPA: Collect information to identify a patient's medication-related problems and health-related needs. (Level 4)	83.3%	16.7%	Yes
EPA: Use evidence-based information to advance patient care. (Level 3)	88.9%	11.1%	Yes

After round two, there were still four EPAs that had not met consensus for their level of entrustment for the roles they were mapped to in Research Question Two. These EPAs fell in patient care skills, scholarship, and collaborator role. The EPA not meeting consensus in the patient care skills role was increased to an entrustment level of 3 (performance with quickly available [reactive] supervision). The two EPAs under the scholarship role were also increased to an entrustment level of 3 as was the one EPA under collaborator. The updated survey was sent to the same participants as rounds one and two.

Round Three. The third round of the Delphi survey followed the same survey procedure as round one and two, except questions were only asked on items that did not meet consensus during round two (4/117 [3.4%] EPA mappings to the roles). The same participant group was used as round one as well. The second round Delphi survey had a total of 13 participants respond (20.6% response rate). Five (38.5%) of the respondents had >20 years of experience, two (15.4%) had 11-20 years of experience, four (30.8%) had 5-10 years of experience, and two (15.4%) had <5 years of experience. Three (23.1%) respondents were male, Nine (69.2%) were female, and one (7.7%) preferred not to answer. Nine (69.2%) had practice sites in urban locations and four (30.8%) had rural practice sites. One (7.7%) respondent was an academic pharmacist, six (46.2%) were ambulatory care pharmacists, two (15.4%) were community pharmacists, and four (30.8%) were hospital pharmacists.

Usage of the same five levels of entrustment occurred for this survey as in rounds one and two. Level 1 entrustment suggests a student can observe but not complete a task (e.g., a student may observe but not do a medication history on a patient). Level 2 is execution with direct and proactive supervision (e.g., student will perform the medication history with the pharmacist in the room providing advice). Level 3 is performance with quickly available (reactive) supervision (e.g., the student will perform the medication history alone with the pharmacist in the next room should help be needed). Level 4 is execution with supervision from a distance or when asked for by the student (e.g., a student can be freely trusted to perform the history without any help). Level 5 is the ability to teach someone else the skill (ten Cate, 2013).

Three roles, patient care skills, scholarship, and collaborator, had EPAs mapped to them that did not reach consensus regarding their level of entrustment during round two. After round three, the one EPA under patient care skills related to implementing a care plan and both EPAs under scholarship related to implementing a care plan and educating patients/colleagues met consensus ($\geq 80\%$ *Strongly Agree/Agree*). However, the EPA under collaborator did not meet consensus. The EPA that did not meet consensus under collaborator was “Implement a care plan in collaboration with the patient, caregivers, and other health professionals.” Delphi participants felt assigning a level was difficult for this EPA as collaborating with other health care professionals requires time to build relationships, which is sometimes hard given the short time students are on rotation. Also, the ability to do this EPA is dependent on the complexity of the patient care plans. Table 24 shows the full results from the third round.

Table 24

EPAs with Level of Entrustment for Patient Care Skills, Scholarship, and Collaborator

EPAs	Strongly Agree/ Agree	Disagree/ Strongly Disagree	Consensus Achieved
<i>Patient Care Skills</i>			
EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. (Level 3)	92.3%	7.7%	Yes
<i>Scholarship</i>			
EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. (Level 3)	84.6%	15.4%	Yes
EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 3)	84.6%	15.4%	Yes
<i>Collaborator</i>			

EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. (Level 3)	76.9%	23.1%	No
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The final overall competency and EPA with levels of entrustment mapping (Appendix F) answers Research Question 3: What level of entrustment should pharmacy graduates be expected to achieve for each EPA? All but five of the EPA statements were determined to have levels of entrustment at Level 3. “Collect information to identify a patient’s medication-related problems and health-related needs” was given a Level 4 (execution with supervision from a distance or when asked for by the student) entrustment regardless of the role and competency mapping. “Maximize the appropriate use of medication in a population and “Minimize adverse drug events and medications in a population” were a Level 2 (execution with direct and proactive supervision) entrustment regardless of the role and competency mapping. “Oversee the pharmacy operation for an assigned shift” also had a Level 2 entrustment regardless of the role and competency mapping.

The EPA, “Educate patients and professional colleagues regarding the appropriate use of medication,” was given different entrustment levels depending on the role mapping. The level of entrustment given was consistent within the role and did not depend on the competency it was mapped too. For the roles of knowledge and scholarship, the EPA had a Level 3 [performance with quickly available (reactive) supervision] entrustment. Whereas for patient care skills, professionalism, systems-based practice/manager, collaborator, and advocate/health promoter, a Level 4 entrustment was given.

Only one EPA did not meet consensus for its entrustment level upon completion of the third Delphi round. This EPA was “Implement a care plan in collaboration with the patient, caregivers, and other health professionals, under the Collaborator role. This EPA, however, did meet consensus for a Level 3 [performance with quickly available (reactive) supervision] entrustment in other roles. This EPA will remain under the collaborator role in the mapping but will not be assigned a level of entrustment since there was no consensus on a level.

Upon the conclusion of this study, all three research questions were answered. The final core role proposal in Appendix D answers Research Question One: What are the core professional roles pharmacy programs believe students should be able to demonstrate competency in upon graduation? Pharmacy expert became the central role of a pharmacist with several core roles defining it. The core roles included knowledge, patient care skills, professionalism, scholarship, systems-based practice, and collaborator. The core roles were then used to answer research questions two and three:

1. What is the alignment of the current pharmacy competencies and entrustable professional activities (EPAs) to the core professional roles?
2. What level of entrustment should pharmacy graduates be expected to achieve for each EPA?

The alignment of the current pharmacy competencies and EPAs with their levels of entrustments developed during the Delphi process for Research Questions Two and Three is in Appendix F. Consensus occurred on all competency and EPA mappings. Consensus occurred on all but one of the EPA levels of entrustment under the collaborator role. Overall, the entrustment levels were consistent for all EPAs regardless of the role and

competency mapping except for the EPA related to education. The EPAs related to educating patients and colleagues did have a level of entrustment that varied depending on the role mapping. Once under a role, however, the EPA had the same level of entrustment regardless of the role's competency mapping. More research is needed to verify this pilot study's results and determine why the EPA related to implementation did not reach consensus.

CHAPTER 5: DISCUSSION

In 2013, pharmacy programs developed and subsequently implemented pharmacy competencies (CAPE outcomes) and EPAs to mirror medicine to help define and assess the knowledge, skills, and attitudes needed by students upon graduation (Medina et al., 2013; Pittenger et al., 2017). While the CAPE outcomes are required to be used by schools/colleges for accreditation, EPAs are not. EPAs also do not have an accreditation required defined level of entrustment, which allows pharmacy programs to set this for themselves. Consequently, this inconsistency means that students may be prepared differently for practice depending on where they graduate and may lead to graduates not being as prepared for safe and effective practice as seen in other professions (Frank et al., 2017; Josiah Macy Jr. Foundation, 2017). Having a defined set of pharmacy roles with competency and EPA mapping along with a set level of entrustment based on progression through a professional's career may be one way to help ensure minimal preparation for all graduates. The purpose of this project was to investigate the extent to which a consensus exists, if any, among pharmacy professionals regarding core practice-ready roles for graduates that then align to current pharmacy competencies and EPA statements, with levels of entrustment. In particular, the study addressed three research questions centered around the development of graduate core practice-ready roles aligned to competencies and EPAs with levels of entrustment using a two-phase embedded mixed-method design.

This chapter discusses the implications of the results of this study with prior research presented in Chapter 2. The discussion will include analyzing how the core roles developed during this project compare with the current pharmacy competencies. It will also review the literature on current validity and definition of entrustment levels for the EPAs, evolving pharmacy practice, employer expectations, and other healthcare professions to determine any gaps in the new roles, competencies, and/or EPAs. Next, a discussion on how the roles and competency/EPA mapping can contribute to the development of school/college pedagogies and assessment to ensure all students are practice-ready upon graduation occurs. Lastly, study limitations, as well as future research and practice implications, are discussed.

The current pharmacy competencies and EPAs are perceived as mapping to the core roles within this study, with some missing competencies. These missing competencies include transitions of care, role modeling, handling difficult conversations, handling difficult situations, conflict management, stress management, and areas related to patient privacy, sensitivity to patients, and ethics. This mapping also reveals that many of the pharmacy competencies map to multiple core roles and are not specific for the role. The lack of specificity regarding the competencies and EPAs makes assessing whether a student is competent for a particular role more difficult for schools/colleges of pharmacy. If a student masters the competency and EPAs related to Problem Solver, for example, are they competent for the role of patient care skills, collaborator, or both? Work is needed to review the current competencies and EPAs to ensure they are specific for the core role to which they are mapped.

In regards to the EPAs, the results from this study mirror the EPA face validity results seen in Haines et al. (2018) but are different than results seen in VanLangen et al. (2019) and Pittenger et al. (2019). Haines et al. reported greater than 75% agreement that the current 15 pharmacy EPA statements describe activities pertinent to pharmacy practice, which was echoed by the participants in the Delphi portion of this project. The difference between this study and the Haines et al. face validity study is Haines et al. just looked at the EPAs themselves, not how they mapped to the current pharmacy competencies. VanLangen et al. and Pittenger et al. both found different results regarding the usefulness of the EPAs in pharmacy practice. VanLangen et al. and Pittenger et al. found that the EPA related to identifying risk for prevalent diseases in a population was not an essential skill for students to have upon graduation. In contrast, this study found that all EPAs were essential and mapped to at least one competency. However, the EPA assessed did depend on the core role the competency mapped too. The results from this study add to the pharmacy literature by asking practitioners if they felt the current EPAs mapped correctly to the pharmacy competencies based on the roles the competency was mapped too. Correct mapping of the EPAs to the pharmacy competencies is vital to ensure the EPAs are adequately assessing whether students are ready to perform the core roles that define a pharmacist's scope of practice. The next steps will be to conduct a more extensive face validity study that includes all stakeholders to ensure the core roles and mappings developed in this study are correct.

Despite participants initially feeling the level of entrustment would depend on the role to which the EPA mapped, after this project, all but one of the EPAs had the same level of entrustment regardless of the role and competency mapping. There was one EPA

that participants felt did have a different level of entrustment based on the role to which it mapped. “Educate patients and professional colleagues regarding the appropriate use of medication,” was given a different level of entrustment depending on the role mapping. The level of entrustment given was consistent within the role and did not depend on the competency it was mapped too. For the roles of knowledge and scholarship, the EPA had a Level 3 entrustment, which is in line with the AACP recommendation (Jarrett et al., 2018). Whereas for patient care skills, professionalism, systems-based practice/manager, collaborator, and advocate/health promoter, a Level 4 entrustment was given. Only one EPA did not meet consensus for its entrustment level upon completion of the third Delphi round. This EPA was “Implement a care plan in collaboration with the patient, caregivers, and other health professionals, under the Collaborator role. This EPA, however, did meet consensus for a Level 3 entrustment in other role mappings. These differences in the level of entrustment depending on the role mapping for certain EPAs needs researching further. Is there truly a different level of entrustment required for the EPA at the role, is the EPA maybe not worded correctly, or is pharmacy not defining levels of entrustment in a manner that works for pharmacy education since there is no residency requirement like medicine?

Data from this study are similar to the medical literature data regarding student EPA entrustment attainment upon graduation. The medical literature suggests that medical students should reach the level of indirect supervision (EPA level 3=without a supervisor’s physical presence but quickly available) upon graduation from medical school (Lomis et al., 2017). This level of entrustment makes sense, given that medical

students are required to complete residency training before starting their careers. Data from the pharmacy literature is a little more conflicting.

Pharmacy faculty and students cannot agree on the level of entrustment necessary upon graduation. VanLangen et al. (2019) found that faculty agreed that 67% (10 out of the 15) of the EPAs had a level three entrustment upon graduation, which is similar in number to the results from this study [60% (nine out of 15)]. On the other hand, students felt they were a level 4 entrustment for all EPAs except collaborating on interprofessional teams and ensuring appropriate vaccinations for which they felt they were a Level 5 upon graduation. This study found the Delphi participants feel that students should achieve a lower level of entrustment attainment than students feel they can obtain upon graduation.

Interestingly, students studied in Pittenger et al. (2019) did not feel as prepared for overseeing pharmacy operations despite saying they felt they were a Level 4 entrustment. This unpreparedness feeling would match the Delphi participants' thoughts on students only achieving a Level 2 entrustment upon graduation. Comparing the results of this study to the pharmacy literature indicates the need for more research in the area of EPAs for pharmacy education. As discussed previously, is there truly a different level of entrustment required for the EPA at the role mapped? The EPA may not be worded correctly for that role, or is pharmacy not defining entrustment levels in a manner that works for pharmacy education since there is no residency requirement like medicine? These are the next questions that need answering.

Before reworking the current pharmacy competencies/EPAs to match the newly developed core roles, the literature on evolving pharmacy practice and employer expectations need reviewing to ensure these new roles cover all areas needed for

graduates to be practice-ready. Schools/colleges of pharmacy need to ensure they teach the knowledge and skills requested by employers to ensure students are employable upon graduation. Based on a review of the current literature, pharmacy employers are looking for graduates that have not only the CAPE outcomes but also have additional skills related to relationship building, adaptability, conflict resolution, time management, and curiosity (Alston et al., 2017; American College of Clinical Pharmacy, 2014; Augustine et al., 2018; Chanakit et al., 2015; Greinter & Knebel, 2003; Hester et al., 2014; Kennie-Kaulbach et al., 2012; McLaughlin et al., 2017; O’Sullivan et al., 2017; Saseen et al., 2017; Thompson et al., 2012; Vlasses et al., 2013). These missing skills requested by employers create a disconnect between what employers want and what they are getting. The core roles developed during this study encompass these additional skills that employers want students to have before graduation. Coverage of relationship-building occurs in patient care skills, collaborator, and advocate/health promoter. Coverage of adaptability, conflict resolution, and innovation occurs in the system-based practice/manager role. Curiosity coverage is under scholarship. The problem is that the current competencies and EPAs mapped to these core roles do not address these specific areas. The lack of specificity would mean that schools/colleges of pharmacy would not be designing pedagogies and assessments to address these areas, which employers consider necessary to hire someone upon graduation. Not only do the core roles contain the skills requested by employers, but they also contain the skills needed for students to be practice-ready for the current healthcare trends that are driving the transformation of the US healthcare system. These trends include changes in (a) technology (e.g., telehealth, telemedicine), (b) healthcare insurance (move to high deductible plans), (c) workforce,

(d) drug supply chains, and, lastly, (e) regulatory (Affordable Health Care Act; Vogenberg & Santilli, 2018).

All the core roles developed during this study will help to prepare students for the healthcare trends of telehealth, telemedicine, and consumer wearables (Vogenberg & Santilli, 2018). Knowledge around the interpretation of healthcare data using technology is essential to allow pharmacists to take a more active role in patient treatment in the community setting leading to new and innovative pharmacy practice models (Vogenberg & Santilli, 2018). To develop these new innovative practice models, pharmacists will need to be continually learning and developing new skills through evidence-based medicine, which is in the scholarship role. The change in the drug delivery models also makes it challenging to ensure everyone has access to all the patient's accurate medical records as patients are now receiving care and medications through multiple places (Vogenberg & Santilli, 2018). Pharmacists need to be part of the teams that look for ways to increase access to medical records needed to treat patients across transitions of care such as the hospital to community and community to the hospital while still maintaining a patient's healthcare confidentiality (Vogenberg & Santilli, 2018). Patient care skills such as communication, collection and assessment of information, and the ability to monitor therapy along with the roles of collaborator and advocate/health promoter will be needed to help pharmacists develop cost-effective treatment plans using these new areas of technology (Vogenberg & Santilli, 2018). The core role definitions design is to ensure students would be prepared to design treatment plans and use technology. However, the competencies and EPAs that schools/colleges of pharmacy use to design pedagogies and assessments around these roles are not specific enough to ensure the same baseline

knowledge is provided to all students regardless of the school/college attended. Also, specific competencies related to contributing to scholarship and the evidence-based medicine literature are lacking. These missing competencies are a crucial oversight. The best way to ensure pharmacy can continue to increase its role on the healthcare team is to have people who are willing to publish and discuss the innovative practice models they are using to take care of patients.

The core roles of knowledge and systems-based practice/manager help to prepare students for the trend of healthcare insurance moving to high deductibles. The knowledge role trains students to integrate the knowledge of biomedical and psychosocial science related to health and disease and clinical science to design patient treatment plans that are cost-effective (Vogenberg & Santilli, 2018). The system-based practice/manager role helps prepare pharmacists to work with both state and national stakeholders to provide pharmacists with ways to bill for patient care services. Billing will be necessary as pharmacy tries to develop innovative practices that take advantage of telehealth and telemedicine opportunities. This role also helps to prepare pharmacists that can work in the broader healthcare landscape to help physicians and other healthcare practitioners choose cost-effective treatments in broader healthcare system settings (Vogenberg & Santilli, 2018). The problem is that the competencies and EPAs listed under these roles occur under other roles, so how would a school/college know if a student was competent in this role categorically instead of one of the other roles. Care needs taking to ensure the competencies and EPAs listed under each of the roles are specific for that role to ensure schools/colleges understand what pedagogies and assessments are needed to ensure students are practice-ready for these healthcare trends.

Patient care skills such as communicating with multiple different entities (patients, caregivers, providers, and insurance companies) will be necessary as the workforce continues to contain a mix of younger and older workers, different races, and different cultures (Pew Research Center, 2016). Changes in the Affordable Care Act affect ways patient access care and how healthcare workers are getting paid for providing care. The changes in healthcare provider payments open the door for pharmacists to provide care to patients in the community setting, given their accessibility and potential to begin to bill for these services (Vogenberg & Santilli, 2018). Pharmacists will also need to watch for regulatory changes that will affect pharmacy (Vogenberg & Santilli, 2018) and will also need to participate in advocating for regulatory changes that will allow pharmacists to bill for services outside of just dispensing a product. Also, similar to some of the other roles, the EPAs listed here are not specific for this role, so if schools/colleges are only using the EPAs listed to assess students, one would not know if a student was competent in this role.

Pharmacists also need to be involved in the changes being made in drug supply chains (Vogenberg & Santilli, 2018) to ensure the safe and ethical delivery of medications occurs with the move to more delivery of medications straight to patient's homes. While the competencies and EPAs mapped to the professionalism role would help ensure students are prepared for the professional aspects of practice, competencies and EPAs related to ethics and patient confidentiality are not explicitly stated. Many schools/colleges of pharmacy teach and assess these areas, but they do not occur as stand-alone competencies and EPAs. This lack of standalone competencies/EPAs could mean that schools/colleges of pharmacy are not intentional about ensuring these concepts are

covered in curricula and assessments as they would be if the competencies/EPAs were listed.

The core roles developed in this study cover the knowledge and skills needed to ensure students are ready for the healthcare trends occurring in the US healthcare system. However, as discussed, the competencies and EPAs used by schools/colleges of pharmacy to develop pedagogies and assessments related to these roles are not specific enough to ensure teaching and assessment of all aspects of the roles. This lack of specificity would mean that students may be prepared differently for practice depending on the school/college attended. For the core roles developed in this study to be useful updated competencies and EPAs would need to be developed. Before updating the competencies and EPAs, the healthcare literature needs to be reviewed as the last component to ensure all healthcare education areas occur in the core roles.

Englander et al. (2013) conducted a review to extract a standard set of competencies for all health professions to aid in interprofessional education. The eight competency domains include patient care, knowledge for practice, practice-based learning and improvement, interpersonal and communication skills, professionalism, systems-based practice, interprofessional collaboration, and personal and professional development. During this study, the core roles developed include five out of the eight of these competency domains: patient care, knowledge, professionalism, systems-based practice, and collaboration. The Englander et al. domains of practice-based learning and improvement fall under the professionalism role in the pharmacy core roles as does personal and professional development. The weaving of communication skills occurs throughout the core roles as opposed to being a standalone competency domain.

Comparing the pharmacy competencies in this study to the Englander list shows most of the Englander competencies map just under different core roles (Englander et al., 2013). However, there are some competencies still missing. One area is patient care, with competencies missing in transitions of care, patient privacy, and sensitivity to patients. Another area with missing competencies is attitudes such as providing role modeling, handling difficult conversations, handling difficult situations, conflict management, stress management, ethics, professional advocacy (not advocating for the good of the patient but advocating for the good of the profession and its place in healthcare), and personal health. The last area missing is systems-based care and includes missing competencies in health outcomes, quality improvement, and public health. Many of these are areas that many schools/colleges of pharmacy would say they cover within their curricula. However, explicit coverage does not occur in the competencies and EPAs despite being considered as part of the core roles needed for pharmacy students to be practice-ready upon graduation and being mentioned by employers as being necessary for practice. It will be essential to review the competencies Englander et al. (2013) created for inclusion in any competencies/EPA updates that would need to be done based on the core roles developed in this study. Having specific competencies in these areas would ensure that all students are practice-ready in all areas upon graduation regardless of the school/college to which they attend.

Another critical literature review is the dimensions of professional competence: cognitive, technical, integrative, relational, and affective/moral constructs. The newly developed pharmacy core roles cover all the professional competency dimensions. The cognitive dimension includes the core knowledge and skills needed to problem-solve

(knowledge and patient-care skills roles). The technical dimension consists of those skills that are hands-on and required for a specific type of pharmacy practice (patient-care skills roles). Integration includes the ability to link basic and clinical knowledge to other disciplines and manage uncertainty within the defined clinical setting and place in the pharmacist's career (the central tenet of pharmacy expert and collaborator, systems-based practice/manager, and scholarship roles). The relationship domain includes the communication skills, teamwork, and conflict-management skills needed to form relationships within the healthcare domain as well as the patient and their families (patient-care skills and collaborator roles). The affective/moral domain includes emotional intelligence and ethics, consisting of the pharmacists' ability to observe their emotional intelligence, curiosity, and willingness to acknowledge and correct errors (professionalism roles). These domains all work together to produce a pharmacist capable of functioning in the ever-changing healthcare world to manage ambiguous problems, tolerate uncertainty, and make decisions with sometimes limited knowledge (Epstein & Hundert, 2002).

The last set of healthcare literature to review for comparison is the medical literature. This review is vital as pharmacy works very closely with medicine. It will be essential to ensure the core roles are defined clearly for pharmacy to avoid jurisdiction issues as these newly defined roles move pharmacy from just an advisory jurisdiction with physicians into more of a limited jurisdiction model (Abbott, 1986). The roles begin to assert that pharmacists can handle patients' medication therapy outside of just advising physicians but with a move into a more independent model. The move to an independent

model will require conversations to ensure that everyone feels comfortable and that a definition of the practice scope is evident.

The jurisdictional issues arise as one looks at a pharmacy expert's roles and see how closely they align with those of a physician. Pharmacy's scope of practice is a pharmacy expert. A pharmacy expert is one that "integrates knowledge, uses appropriate patient care skills, and is professional to provide safe, high-quality, evidence-based, and patient-centered" within a pharmacist's limits of expertise. The pharmacy expert definition is very similar to the CanMEDs' definition of a medical expert, which defines the physician scope of practice: "physicians integrate all of the roles, applying medical knowledge, clinical skills, and professional values in their provision of high-quality and safe patient-centered care" (Frank et al., 2015, p. 3). As conversations regarding jurisdiction start, one needs to keep in mind that a pharmacist's area of expertise lies with the medication therapy management and public health areas related to medications and their use for the prevention and treatment of disease (Frenck et al., 2010; Isasi & Krofah, 2015). Now that a set of core roles as been proposed for pharmacy, the conversations around jurisdiction can begin with a universal language.

The development of core roles with mapping has helped to demonstrate some of the gaps in the current pharmacy competencies and EPAs that schools/colleges of pharmacy use to develop pedagogies and assessments. These gaps may be leading to students not be as prepared for practice as needed. Since the development of a core set of pharmacy roles has occurred, schools/colleges of pharmacy could use the medical model of competency and EPA development to ensure all areas of the roles are taught and assessed in schools/colleges of pharmacy.

The core medical roles played an essential part in the development of the medicine competency statements used to drive pedagogy and assessment for medical education. A person achieving all the competencies for a given role is said to be “competent” in that area. For example, CanMeds defines five critical competencies for the medical expert role. One of these competencies is “practice medicine within their defined scope of practice and expertise” (Frank et al., 2014, p. 10). The creation of assessments occurs from the enabling competencies that are under each of the five broader competencies. For example, under the competency just mentioned, there are six enabling competencies with one being “Integrate the CanMEDS Intrinsic Roles into their practice of medicine” (Frank et al., 2014, p. 10). With the development of a set of core roles, pharmacy can now work through a similar process. Mapping of competencies that cover all areas of the core roles would help to ensure that all students are prepared the same upon graduation regardless of the school/college of pharmacy from which they graduate. It would also allow the development of assessments to share among schools/colleges of pharmacy.

Assessment planning is a critical step to determine if students are practice-ready. Medical school is ahead of pharmacy in the development of competencies and assessment of competence. Medicine has defined levels of competency depending on where a student is in their career. The competency levels in medical school are medical school fundamentals and early clinical activity. Competency levels for residency are transitions to discipline, foundations of the discipline, and core of the discipline. Lastly, competency levels for learning in practice are transitions to practice and continuing professional development (Frank et al., 2014). While pharmacy has created competencies and EPAs, it

has not defined entrustment levels based on students' progress through their career, nor does pharmacy agree on the level of entrustment upon graduation.

For performance activities like entrustable professional activities to be useful, one needs to map the EPA's competencies and set the entrustment level required for each stage of training (Modi et al., 2015). Medicine has created such a mapping with their roles mapped to competencies to EPAs with defined entrustment levels for a particular time in a student's learning career (medical school, residency). While pharmacy has created the competencies and EPAs, there is no set level of entrustment that all schools/colleges are using, nor is there a set entrustment level depending on a student's stage of their career. The work done in this project continues to add to the literature showing there is work that pharmacy needs to do in the area of entrustment as one of the EPAs did not reach consensus. Also, some of the EPA levels of entrustment varied depending on the role to which it was mapped. The development of a set of core roles with mapping to the current pharmacy competencies and EPAs is the first step in pharmacy developing an education model similar to medicine.

Study Limitations

Several limitations need discussing with this study. One limitation was the inability to find a time that worked best for all potential NGT groups to meet. The initial invited group contained six members, with only five members being able to participate. Even with this limitation, the NGT group was still a mix of four different pharmacy programs and different opinions related to pharmacists' roles. The small size of the NGT group, while planned, is another potential limitation of this study. While a small group was suitable for this pilot study, a broad consensus development process would need doing before these roles could be considered for implementation across the country.

Another potential limitation of NGT studies is the potential for one or more participants to dominate the conversation or push their views. This domination of conversation could have potentially been a big issue in this study, given the large pharmacy programs involved and the research interests of the participants. Everyone listened to the facilitator and answered one at a time during each round. Everyone provided thoughtful answers for both strengths and limitations and participated equally. There were no feelings of domination or pushing one set of views. Thus, the limitation of the potential domination of conversation in this study was avoided.

Some of the Delphi method's disadvantages include the time it takes to do the process and the potential for a low response rate to the surveys (McMillan et al., 2016). The time it takes to do the Delphi method was one big negative to the use of this process, but combining the research questions into one Delphi survey helped limit some of the timetable. This project's timetable did get pushed back due to a pandemic situation that caused the surveys to go out later than was initially intended. Once the surveys started, though, the process flowed through the timeline as initially scheduled. The potential for a low response rate was also a limitation. The response rate for the surveys was around 30-40%, which is relatively low. The responses, though, are representative of the pharmacy practice population. The samples chosen came from four diverse areas of the country (Arkansas, Kentucky, North Carolina, and Minnesota). Participants were also from varied backgrounds that are representative of the broad areas of current pharmacy practice. This study's number of responses should not be a problem as this study is a pilot study, and larger Delphi groups would be needed before this data could be widely used.

Besides the limitations of the consensus processes chosen for this study, threats to internal and external validity also needed to be considered (Campbell & Stanley, 1963). Sample bias and reactive effects of arrangements are threats to external validity that were potential factors in this study (Campbell & Stanley, 1963). Reactive effects of arrangements refer to the inability to generalize to non-experimental settings because the experimental setting is artificial. Reactive effects of arrangements could have been potentially a problem in this study since no actual testing of the alignments and levels of entrustment happened; instead, results are from practitioners' thoughts about the appropriate alignments and levels of entrustment achievement. Future studies will need to be conducted in real-world educational settings to determine if the entrustment levels are correct. The threat of reactive effects of arrangements is less of a validity threat as the consensus participants were active practitioners with various practice experience. They were capable of accurately determining what graduates need to perform upon graduation. Sample bias is the last threat to external validity. Sample bias occurs when there is a chance that the sample chosen for the study may not represent the population of interest. Sample bias was a potential threat in this study, given only a small number of pharmacists participated in the consensus development process, which may have led to a lack of diversity (i.e., race, age, rural/urban practice sites). Mitigation of sample bias occurred by using a non-randomized sample chosen by the NGT process members to ensure that the sample selected is a diverse mix of pharmacy practice types and levels of experience (Campbell & Stanley, 1963).

Threats to internal validity also need to be considered. Internal validity threats that had be considered included (a) history, (b) maturation, (c) testing, (d)

instrumentation, and (e) experimenter bias (Campbell & Stanley, 1963). History is when events occur during the study that may impact the results, which could be an issue between the Delphi rounds if participants were to change jobs or learn different information that may change the way they think about the alignments and levels of entrustments in between the rounds. Maturation could be a problem as processes with the participants (aging, experience) could impact the outcomes. Mitigation of history and maturation occurred by keeping the time between the rounds to no more than 2-3 weeks. Another potential internal threat is testing itself as results are affected when participants do multiple rounds of “testing.” Testing was mitigated by only using two to three rounds of the Delphi process. The last threat to internal validity is experimenter bias, which occurs when the experimenter’s expectations of the results may consciously or unconsciously affect the results. The experimenter’s thoughts regarding what the core roles should be along with the mapping and EPA levels could come through in the way the results are presented. The experimenter’s potential to influence the results were mitigated through the design of the NGT process for Research Question One and then through providing both the original as well as the changed mappings and levels of entrustment in each round of the Delphi process, thus allowing Delphi participants to serve as reviewers to ensure researcher bias was mitigated (Campbell & Stanley, 1963).

Future Research/Practice Implications

Results from this study will have an impact on pharmacy, pharmacy education, and pharmacy research methodologies in multiple ways. For pharmacy education, the development of the pharmacy roles is the first step to ensuring students are minimally prepared for all potential pharmacy practice areas both now and in the future. As education begins to train pharmacists in these new roles, professional jurisdiction

discussions will need to occur to ensure everyone understands what pharmacists are prepared to undertake and that these roles can help further advance the practice of other professions instead of limiting their practice (Abbott, 1986).

The development of core roles with the alignment of pharmacy competencies and EPAs will provide a roadmap for minimum competency (Lumina Foundation, 2014). The developed core roles also help describe what the pharmacy profession can do for other identities both inside and outside healthcare. The core roles will help propel the profession forward as they work to increase pharmacy's professional identity and move to more cognitive practice instead of just dispensing of a product. While the core roles and competency/EPA mapping will be useful for schools/colleges of pharmacy, more research and consensus building will be needed before they are ready for incorporation into the accreditation standards. This is especially true for the levels of entrustment given that one of the EPAs did not reach consensus on a level. Another future research area will be what role do the pre-program requirements for pharmacy school play in students' development for these future pharmacy roles? Should pharmacy consider requiring a degree before entry to allow students to start developing some of the necessary competencies before entry into a pharmacy program?

Lastly, this study further demonstrates how mixed-methods study techniques can be used in pharmacy educational research. The nominal group technique conducted via video conferencing and the Delphi technique conducted via electronic survey can be beneficial methods in gathering a broader consensus on the development of pharmacy roles and other areas needing consensus. These are research methods that are currently

gaining use in the pharmacy literature but could be used more often for research studies that need to gather data that generates ideas or develops guidelines.

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Appendix A

Pharmacy CAPE Outcomes

The 15 CAPE outcomes, with one-word descriptors, center around four large domains (Medina et al., 2013). The four broad domains include Foundational Knowledge (knowledge), Essentials for Practice and Care (skills), Approach to Practice and Care (skills), and Personal and Professional Development (attitudes; Medina et al., 2013). The CAPE design was to represent all areas of pharmacy and guide the curricular and assessment efforts of schools/colleges of pharmacy. The 15 CAPE outcomes include (Medina et al., 2013, p. 3-8):

Domain 1: Foundational Knowledge

- 1.1 Learner: Develop, integrate, and apply knowledge from the foundational sciences (i.e., pharmaceutical, social/behavioral/administrative, and clinical sciences) to evaluate the scientific literature, explain drug action, solve therapeutic problems, and advance population health and patient-centered care

Domain 2: Essentials for Practice and Care

- 2.1 Patient-centered care (Caregiver): Provide patient-centered care as the medication expert (collect and interpret evidence, prioritize, formulate assessments and recommendations, implement, monitor and adjust plans, and document activities).

- 2.2 Medication use systems management (Manager): Manage patient healthcare needs using human, financial, technological, and physical resources to optimize the safety and efficacy of medication use.
- 2.3 Health and wellness (Promoter): Design prevention, intervention, and educational strategies for individuals and communities to manage chronic disease and improve health and wellness.
- 2.4 Population-based care (Provider): Describe how population-based care influences patient-centered care and influences the development of practice guidelines and evidence-based best practices.

Domain 3: Approach to Practice and Care

- 3.1 Problem Solving (Problem Solver): Identify problems, explore and prioritize potential strategies, and design, implement, and evaluate a viable solution.
- 3.2 Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.
- 3.3 Patient Advocacy (Advocate): Assure that patients' best interests are represented.
- 3.4 Interprofessional collaboration (Collaborator): Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs.
- 3.5 Cultural sensitivity (Includer): Recognize social determinants of health to diminish disparities and inequities in access to quality care.
- 3.6 Communication (Communicator): Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.

Domain 4: Personnel and Professional Development

- 4.1 Self-awareness (Self-aware): Examine and reflect on personal knowledge, skills, abilities, beliefs, biases, motivation, and emotions that could enhance or limit personal and professional growth.
- 4.2 Leadership (Leader): Demonstrate responsibility for creating and achieving shared goals, regardless of position.
- 4.3 Innovation and Entrepreneurship (Innovator): Engage in innovative activities by using creative thinking to envision better ways of accomplishing professional goals.
- 4.4 Professionalism (Professional): Exhibit behaviors and values that are consistent with the trust given by the profession by patients, other healthcare providers, and society.

Appendix B

Pharmacy Entrustable Professional Activities (EPAs)

EPA creation for pharmacy started in 2015-16 with the Academic Affairs Standing Committee of AACP. The president charged this committee to identify EPAs for pharmacy graduates as they transition from completion of their advanced pharmacy practice experiences into professional practice and other postgraduate opportunities. This work continued with the 2016-17 Academic Affairs committee, which compiled comments and input from stakeholders regarding the draft EPAs and completing the final edits. The fifteen EPAs created by the Academic Affairs Committee are as follows (Haines et al., 2017, p. 3-4):

Patient Care Provider Domain

- Collect information to identify a patient's medication-related problems and health-related needs.
- Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs.
- Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective.
- Implement a care plan in collaboration with the patient, caregivers, and other health professionals.
- Follow-up and monitor a care plan.

IPE Team Member Domain

- Collaborate as a member of an IPE team.

Population Health Promoter Domain

- Identify patients at risk for prevalent disease in a population.
- Minimize adverse drug events and medications in a population.
- Maximize the appropriate use of medications in a population.
- Ensure that patients have been immunized against vaccine-preventable diseases.

Information Master Domain

- Educate patients and professional colleagues regarding the appropriate use of medication.
- Use evidence-based information to advance patient care.

Practice Manager Domain

- Oversee the pharmacy operations for an assigned shift.
- Full-fill a medication order.

Self-Developer Domain

- Create a written plan for continuous professional development

Appendix C

Initial Core Pharmacist's Role Proposal

Figure C.1: Model of Initial Core Pharmacist's Role

Figure C.1. Graphical depiction of the initial core pharmacist's role. Adapted from "ACGME common program Requirements [Web page]," by Accreditation Council for Graduate Medical Education., 2017, Retrieved from https://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRs_2017-07-01.pdf; "CanMeds 2015 Physician Competency Framework", by J. R. Frank et al., 2015, Ottawa: Royal College of Physicians and Surgeons of Canada; "Generic professional

capabilities framework," by General Medical Council, 2017, Retrieved from www.gmc-uk.org.

Central Role: Pharmacotherapeutics Expert

- Pharmacotherapeutics experts integrate all the tenets such as knowledge, using appropriate patient care skills, and being professional to provide high-quality and safe patient-centered care. Being a pharmacotherapeutics expert is the central role of a pharmacist and defines the pharmacist's scope of practice.
- A pharmacotherapeutics expert will draw upon their knowledge, skills, and attitudes to collect and interpret information, make clinical decisions, and make therapeutics interventions. This is done within their scope of practice and with the understanding of the limits of their expertise. Decision-making is informed by evidence-based medicine and considers the patient and their caregivers' preferences and the appropriate use of available resources. Their practice is up-to-date, ethical, and conducted in collaboration with other members of the healthcare team as well as the patient and their caregivers.

Core Roles Needed to Become The "Expert":

- Knowledge
 - Pharmacists must integrate knowledge of biomedical, psychological, and social science principles of health and disease, and clinical science to design appropriate treatment plans for their patients. This knowledge includes understanding these principles across the life-span of the patient.
 - Pharmacists understand that they serve a unique role in the healthcare team. They are the "medication" experts and possess the most knowledge of how medications contribute to the patient's care.

- Patient Care Skills
 - Pharmacists must be able to perform basic patient care skills such as communication, collection, and assessment of information to formulate a treatment plan and ability to monitor if a treatment is successful or not.
 - Pharmacists need to ensure they take a patient's cultural, education level, and financial status into account when formulating a treatment plan to ensure a patient's plan can be adherent. Pharmacists also understand that part of patient care should include discussing the plan with the patient and their support system as needed.
- Professionalism
 - Pharmacists are committed to the health and well-being of their patients, society, and themselves. This is demonstrated through ethical practice, high standards of personal behavior, accountability to the profession and society, and maintenance of their health.
 - Pharmacists serve essential roles in the healthcare team and society, as such, professional identity is central. This tenet includes promotion of the public good, adherence to high ethical and moral standards. It recognizes that to provide good quality patient care, they must take care of themselves and others in their profession.
- Scholarship
 - Pharmacists are committed to excellence in their practice through life-long professional development, the teaching of others, the use of evidence-based medicine, and contributing to scholarship.

- Systems-based Practice/Manager
 - Pharmacists are committed to safety and quality in health care, professional advocacy, health insurance, health care economics, transitions of care, and chronic care of patients.
 - Pharmacists understand that they work as part of a more extensive "system" of health care and that to provide good, quality care, they need to be able to coordinate care within the systems, provide treatment recommendations that work with the patient's insurance, and be an advocate for optimal and quality patient care. Pharmacists also need to be an advocate for the profession on professional roles/responsibilities and the ability to bill for services
- Collaborator
 - Pharmacists work with other healthcare professionals to provide safe, high-quality, and patient-centered care.
 - Pharmacists understand that being able to function effectively in an interprofessional team is necessary to provide safe, high-quality, and effective patient care. Collaboration is also important with the patient and their support systems. Collaboration requires trust, respect, and shared decision-making. It also requires the sharing of knowledge, perspectives, responsibilities, and the willingness to learn from others. To collaborate effectively, one must understand others' roles on the team, be pursuing common goals, and manage conflict effectively.
- Advocate/Health Promoter

- Pharmacists are committed to using their expertise and influence to work with patient populations to improve communities' health and wellness. They work to understand the needs, speak on behalf of others, and seek to mobilize resources to effect change when needed.
- Pharmacists understand that improving health is not limited to treating illness but also includes disease prevention, health promotion, and health protection. They understand their unique place in the healthcare team, and society allows them access to populations that others may not have. Pharmacists understand the need to work with patients to navigate complex medical situations to get the care they may need.

Appendix D

Final Core Pharmacist's Role Proposal

Figure D.1. Model of Final Core Pharmacist's Roles

Figure D.1. Graphical depiction of the initial core pharmacist's role. Adapted from "ACGME common program Requirements [Web page]," by Accreditation Council for Graduate Medical Education., 2017, Retrieved from https://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/CPRs_2017-07-01.pdf; "CanMeds 2015 Physician Competency Framework", by J. R. Frank et al., 2015, Ottawa: Royal College of Physicians and Surgeons of Canada; "Generic professional

capabilities framework," by General Medical Council, 2017, Retrieved from www.gmc-uk.org.

Central Role: Pharmacy Expert

- Pharmacy experts integrate all the tenets such as knowledge, using appropriate patient care skills, and being professional to provide safe, high-quality, evidence-based, and patient-centered care. Being a pharmacy expert is the pharmacist's central role and defines the pharmacist's scope of practice.
- A pharmacy expert will draw upon their knowledge, skills, and attitudes to collect and interpret information, make clinical decisions, make therapeutics interventions, and monitor the results of therapeutic interventions. This is done within their scope of practice and with the understanding of the limits of their expertise. A pharmacy expert also understands they work as part of a more extensive "system" of healthcare to coordinate and advocate optimal and quality patient care to improve health by treating illnesses, disease prevention, health promotion, and health protection. Decision-making is informed by evidence-based medicine and considers the patient and their caregivers' preferences and the appropriate use of available resources. Their practice is up-to-date, innovative, ethical, and is conducted in collaboration with other members of the healthcare team as well as the patient and their caregivers.

Core Roles Needed To Become The "Expert":

- Knowledge
 - Pharmacists must integrate knowledge of biomedical and psychosocial science principles of health and disease, and clinical science to design

appropriate treatment plans for their patients. This knowledge includes understanding these principles across the life-span of the patient.

- Pharmacists understand that they serve a unique role in the healthcare team. They are the "medication" experts and possess the most knowledge of how medications contribute to the patient's care.
- Patient Care Skills
 - Pharmacists must be able to perform basic patient care skills such as communication, collection and assessment of information to formulate and implement a treatment plan, and the ability to monitor if a treatment is successful or not.
 - Pharmacists need to ensure they take a patient's cultural, education level, and financial status into account when formulating a treatment plan to ensure a patient's plan can be adherent. Pharmacists also understand that part of patient care should include discussing the plan in a compassionate and empathetic manner with the patient and their support system as needed.
- Professionalism
 - Pharmacists are committed to the health and well-being of their patients, society, and themselves. This is demonstrated through ethical practice, high standards of personal behavior, accountability to the profession and society, and maintenance of their health.
 - Pharmacists serve essential roles in the healthcare team and society, as such, professional identity is central. This tenet includes promotion of the

public good, adherence to high ethical and moral standards. It recognizes that to provide good quality patient care, they must take care of themselves and others in their profession.

- Scholarship
 - Pharmacists are committed to excellence in their practice through life-long professional development, the teaching of others, developing new innovative practices that advance the profession, and the use of evidence-based medicine. Pharmacists are committed to finding and promoting drugs and other health information that is evidence-based and up-to-date.
 - Pharmacists understand the importance of contributing to scholarship and evidence-based medical literature.
- Systems-based Practice/Manager
 - Pharmacists are committed to safety and quality in health care, professional advocacy, health insurance, health care economics, health outcomes, quality improvement, transitions of care, public health, and patients' chronic care.
 - Pharmacists understand that they work as part of a more extensive "system" of health care and that to provide good, quality care, they need to be able to coordinate care within the systems, provide treatment recommendations that work with the patients' insurance, and be an advocate for optimal and quality patient care. Pharmacists also need to advocate for the profession on professional roles/responsibilities and the ability to bill for services.

- Collaborator
 - Pharmacists work with other healthcare professionals to provide safe, high-quality, evidence-based, and patient-centered care.
 - Pharmacists understand that being able to function effectively in an interprofessional team is necessary to provide safe, high-quality, and patient-centered care. Collaboration is also important with the patient and their support systems. Collaboration requires trust, respect, and shared decision-making. It also requires the sharing of knowledge, perspectives, responsibilities, and the willingness to learn from others. To collaborate effectively, one must understand the roles of others on the team, articulate one's role on the team, be pursuing common goals, and manage conflict effectively.
- Advocate/Health Promoter
 - Pharmacists are committed to using their expertise and influence to work with patient populations to improve communities' health and wellness. They work to understand the needs, speak on behalf of others, and seek to mobilize resources to effect change when needed.
 - Pharmacists understand that improving health is not limited to treating illness but also includes disease prevention, health promotion, and health protection. They understand their unique place in the healthcare team, and society allows them access to populations that others may not have. Pharmacists understand the need to work with patients to navigate complex medical situations to get the care they may need.

Appendix E

Initial Roles/Competencies/EPA Mapping

Role: Knowledge

Pharmacists must integrate knowledge of biomedical and psychosocial science principles of health and disease, and clinical science to design appropriate treatment plans for their patients. This knowledge includes understanding these principles across the life-span of the patient. Pharmacists understand that they serve a unique role in the healthcare team. They are the "medication" experts and possess the most knowledge of how medications contribute to the patient's care.

- 1.1 Learner: Develop, integrate, and apply knowledge from the foundational sciences (i.e., pharmaceutical, social/behavioral/administrative, and clinical sciences) to evaluate the scientific literature, explain drug action, solve therapeutic problems, and advance population health and patient-centered care
 - EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs.
 - EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective.
 - EPA: Collaborate as a member of an IPE team.
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication.

- EPA: Use evidence-based information to advance patient care.

Role: Patient Care Skills

Pharmacists must be able to perform basic patient care skills such as communication, collection and assessment of information to formulate and implement a treatment plan, and the ability to monitor if a treatment is successful or not. Pharmacists need to ensure they take a patient's cultural, education level, and financial status into account when formulating a treatment plan to ensure a patient's plan can be adherent. Pharmacists also understand that part of patient care should include discussing the plan in a compassionate and empathetic manner with the patient and their support system as needed.

- 2.1 Patient-centered care (Caregiver): Provide patient-centered care as the medication expert (collect and interpret evidence, prioritize, formulate assessments and recommendations, implement, monitor and adjust plans, and document activities).
 - EPA: Collect information to identify a patient's medication-related problems and health-related needs.
 - EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs.
 - EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective.
 - EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals.

- EPA: Follow-up and monitor a care plan.
- EPA: Maximize the appropriate use of medications in a population.
- EPA: Ensure that patients have been immunized against vaccine-preventable diseases.
- 2.3 Health and wellness (Promoter): Design prevention, intervention, and educational strategies for individuals and communities to manage chronic disease and improve health and wellness.
 - EPA: Collect information to identify a patient's medication-related problems and health-related needs.
 - EPA: Identify patients at risk for prevalent disease in a population.
 - EPA: Minimize adverse drug events and medications in a population.
 - EPA: Maximize the appropriate use of medications in a population.
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases.
- 3.1 Problem Solving (Problem Solver): Identify problems, explore and prioritize potential strategies, and design, implement, and evaluate a viable solution.
 - EPA: Collect information to identify a patient's medication-related problems and health-related needs.
 - EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs.
 - EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals.
 - EPA: Collaborate as a member of an IPE team.

- EPA: Oversee the pharmacy operations for an assigned shift.
- EPA: Full-fill a medication order.
- 3.2 Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.
 - EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals.
 - EPA: Identify patients at risk for prevalent disease in a population.
 - EPA: Minimize adverse drug events and medications in a population.
 - EPA: Maximize the appropriate use of medications in a population.
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases.
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication.
- 3.6 Communication (Communicator): Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.
 - EPA: Collect information to identify a patient's medication-related problems and health-related needs.
 - EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs.
 - EPA: Follow-up and monitor a care plan.
 - EPA: Collaborate as a member of an IPE team.
 - EPA: Identify patients at risk for prevalent disease in a population.
 - EPA: Minimize adverse drug events and medications in a population.

- EPA: Maximize the appropriate use of medications in a population.
- EPA: Ensure that patients have been immunized against vaccine-preventable diseases.
- EPA: Educate patients and professional colleagues regarding the appropriate use of medication.
- EPA: Use evidence-based information to advance patient care.
- EPA: Oversee the pharmacy operations for an assigned shift.
- EPA: Full-fill a medication order.

Role: Professionalism

Pharmacists are committed to the health and well-being of their patients, society, and themselves. This is demonstrated through ethical practice, high standards of personal behavior, accountability to the profession and society, and maintenance of their health. Pharmacists serve essential roles in the healthcare team and society, as such, professional identity is central. This tenet includes promotion of the public good, adherence to high ethical and moral standards. It recognizes that to provide good quality patient care, they must take care of themselves and others in their profession.

- 4.1 Self-awareness (Self-aware): Examine and reflect on personal knowledge, skills, abilities, beliefs, biases, motivation, and emotions that could enhance or limit personal and professional growth.
 - EPA: Collaborate as a member of an IPE team.
 - EPA: Oversee the pharmacy operations for an assigned shift.
 - EPA: Create a written plan for continuous professional development

- 4.2 Leadership (Leader): Demonstrate responsibility for creating and achieving shared goals, regardless of position.
 - EPA: Collaborate as a member of an IPE team.
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication.
 - EPA: Oversee the pharmacy operations for an assigned shift.
- 4.3 Innovation and Entrepreneurship (Innovator): Engage in innovative activities by using creative thinking to envision better ways of accomplishing professional goals.
 - EPA: Collaborate as a member of an IPE team.
 - EPA: Use evidence-based information to advance patient care.
 - EPA: Oversee the pharmacy operations for an assigned shift.
- 4.4 Professionalism (Professional): Exhibit behaviors and values that are consistent with the trust given by the profession by patients, other healthcare providers, and society.
 - EPA: Collaborate as a member of an IPE team.
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication.
 - EPA: Oversee the pharmacy operations for an assigned shift.
 - EPA: Create a written plan for continuous professional development

Role: Scholarship

Pharmacists are committed to excellence in their practice through life-long professional development, the teaching of others, developing new innovative practices

that advance the profession, and the use of evidence-based medicine. Pharmacists are committed to finding and promoting drugs and other health information that is evidence-based and up-to-date. Pharmacists understand the importance of contributing to scholarship and evidence-based medical literature.

- 3.2 Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.
 - EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals.
 - EPA: Identify patients at risk for prevalent disease in a population.
 - EPA: Minimize adverse drug events and medications in a population.
 - EPA: Maximize the appropriate use of medications in a population.
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases.
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication.
- 3.6 Communication (Communicator): Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication.
 - EPA: Use evidence-based information to advance patient care.
- 4.3 Innovation and Entrepreneurship (Innovator): Engage in innovative activities by using creative thinking to envision better ways of accomplishing professional goals.

- EPA: Collaborate as a member of an IPE team.
- EPA: Use evidence-based information to advance patient care.
- EPA: Oversee the pharmacy operations for an assigned shift.

Roles: Systems-based Practice/Manager

Pharmacists are committed to safety and quality in health care, professional advocacy, health insurance, health care economics, health outcomes, quality improvement, transitions of care, public health, and patients' chronic care. Pharmacists understand that they work as part of a more extensive "system" of health care and that to provide good, quality care, they need to be able to coordinate care within the systems, provide treatment recommendations that work with the patients' insurance, and be an advocate for optimal and quality patient care. Pharmacists also need to advocate for the profession on professional roles/responsibilities and the ability to bill for services.

- 2.2 Medication use systems management (Manager): Manage patient healthcare needs using human, financial, technological, and physical resources to optimize the safety and efficacy of medication use.
 - EPA: Collect information to identify a patient's medication-related problems and health-related needs.
 - EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective.
 - EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals.
 - EPA: Follow-up and monitor a care plan.

- EPA: Minimize adverse drug events and medications in a population.
- EPA: Maximize the appropriate use of medications in a population.
- EPA: Ensure that patients have been immunized against vaccine-preventable diseases.
- EPA: Oversee the pharmacy operations for an assigned shift.
- EPA: Full-fill a medication order.
- 3.2 Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.
 - EPA: Identify patients at risk for prevalent disease in a population.
 - EPA: Minimize adverse drug events and medications in a population.
 - EPA: Maximize the appropriate use of medications in a population.
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases.
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication.
- 3.6 Communication (Communicator): Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.
 - EPA: Oversee the pharmacy operations for an assigned shift.
 - EPA: Full-fill a medication order.
- 4.2 Leadership (Leader): Demonstrate responsibility for creating and achieving shared goals, regardless of position.
 - EPA: Collaborate as a member of an IPE team.

- EPA: Educate patients and professional colleagues regarding the appropriate use of medication.
- EPA: Oversee the pharmacy operations for an assigned shift.

Role: Collaborator

Pharmacists work with other healthcare professionals to provide safe, high-quality, evidence-based, and patient-centered care. Pharmacists understand that being able to function effectively in an interprofessional team is necessary to provide safe, high-quality, and patient-centered care. Collaboration is also important with the patient and their support systems. Collaboration requires trust, respect, and shared decision-making. It also requires the sharing of knowledge, perspectives, responsibilities, and the willingness to learn from others. To collaborate effectively, one must understand the roles of others on the team, articulate one's role on the team, be pursuing common goals, and manage conflict effectively.

- 3.1 Problem Solving (Problem Solver): Identify problems, explore and prioritize potential strategies, and design, implement, and evaluate a viable solution.
 - EPA: Collaborate as a member of an IPE team.
- 3.2 Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.
 - EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals.
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication.

- 3.4 Interprofessional collaboration (Collaborator): Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs.
 - EPA: Follow-up and monitor a care plan.
 - EPA: Collaborate as a member of an IPE team.
 - EPA: Identify patients at risk for prevalent disease in a population.
 - EPA: Minimize adverse drug events and medications in a population.
 - EPA: Maximize the appropriate use of medications in a population.
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases.
- 3.6 Communication (Communicator): Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.
 - EPA: Collaborate as a member of an IPE team.
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication.

Role: Advocate/Health Promoter

Pharmacists are committed to using their expertise and influence to work with patient populations to improve communities' health and wellness. They work to understand the needs, speak on behalf of others, and seek to mobilize resources to effect change when needed. Pharmacists understand that improving health is not limited to treating illness but also includes disease prevention, health promotion, and health protection. They understand their unique place in the healthcare team, and society allows

them access to populations that others may not have. Pharmacists understand the need to work with patients to navigate complex medical situations to get the care they may need.

- 2.4 Population-based care (Provider): Describe how population-based care influences patient-centered care and influences the development of practice guidelines and evidence-based best practices.
 - EPA: Identify patients at risk for prevalent disease in a population.
 - EPA: Minimize adverse drug events and medications in a population.
 - EPA: Maximize the appropriate use of medications in a population.
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases.
- 3.2 Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.
 - EPA: Identify patients at risk for prevalent disease in a population.
 - EPA: Minimize adverse drug events and medications in a population.
 - EPA: Maximize the appropriate use of medications in a population.
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases.
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication.
- 3.3 Patient Advocacy (Advocate): Assure that patients' best interests are represented.

- EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective.
- EPA: Collaborate as a member of an IPE team.
- EPA: Minimize adverse drug events and medications in a population.
- EPA: Maximize the appropriate use of medications in a population.
- EPA: Ensure that patients have been immunized against vaccine-preventable diseases.
- EPA: Educate patients and professional colleagues regarding the appropriate use of medication.
- 3.5 Cultural sensitivity (Includer): Recognize social determinants of health to diminish disparities and inequities in access to quality care.
 - EPA: Collect information to identify a patient's medication-related problems and health-related needs.
 - EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective.
 - EPA: Identify patients at risk for prevalent disease in a population.
 - EPA: Minimize adverse drug events and medications in a population.
 - EPA: Maximize the appropriate use of medications in a population.
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases.

- EPA: Educate patients and professional colleagues regarding the appropriate use of medication.
- EPA: Use evidence-based information to advance patient care.

Appendix F

Mapping of Competencies and EPAs With Levels of Entrustment to Core Roles

Role: Knowledge

Pharmacists must integrate knowledge of biomedical and psychosocial science principles of health and disease, and clinical science to design appropriate treatment plans for their patients. This knowledge includes understanding these principles across the life-span of the patient. Pharmacists understand that they serve a unique role in the healthcare team. They are the “medication” experts and possess the most knowledge of how medications contribute to the patient's care.

- 1.1 Learner: Develop, integrate, and apply knowledge from the foundational sciences (i.e., pharmaceutical, social/behavioral/administrative, and clinical sciences) to evaluate the scientific literature, explain drug action, solve therapeutic problems, and advance population health and patient-centered care
 - EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs. (Level 3)
 - EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective. (Level 3)
 - EPA: Collaborate as a member of an IPE team. (Level 3)

- EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 3)
- EPA: Use evidence-based information to advance patient care. (Level 3)

Role: Patient Care Skills

Pharmacists must be able to perform basic patient care skills such as communication, collection and assessment of information to formulate and implement a treatment plan, and ability to monitor if a treatment is successful or not. Pharmacists need to ensure they take a patient's cultural, education level, and financial status into account when formulating a treatment plan to ensure a patient's plan can be adherent. Pharmacists also understand that part of patient care should include discussing the plan in a compassionate and empathetic manner with the patient and their support system as needed.

- 2.1 Patient-centered care (Caregiver): Provide patient-centered care as the medication expert (collect and interpret evidence, prioritize, formulate assessments and recommendations, implement, monitor and adjust plans, and document activities).
 - EPA: Collect information to identify a patient's medication-related problems and health-related needs. (Level 4)
 - EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs. (Level 3)
 - EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective. (Level 3)

- EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. (Level 3)
- EPA: Follow-up and monitor a care plan. (Level 3)
- EPA: Maximize the appropriate use of medications in a population. (Level 2)
- EPA: Ensure that patients have been immunized against vaccine-preventable diseases. (Level 3)
- 2.3 Health and wellness (Promoter): Design prevention, intervention, and educational strategies for individuals and communities to manage chronic disease and improve health and wellness.
 - EPA: Collect information to identify a patient's medication-related problems and health-related needs. (Level 4)
 - EPA: Identify patients at risk for prevalent disease in a population. (Level 3)
 - EPA: Minimize adverse drug events and medications in a population. (Level 2)
 - EPA: Maximize the appropriate use of medications in a population. (Level 2)
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases. (Level 3)
- 3.1 Problem Solving (Problem Solver): Identify problems, explore and prioritize potential strategies, and design, implement, and evaluate a viable solution.

- EPA: Collect information to identify a patient's medication-related problems and health-related needs. (Level 4)
- EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs. (Level 3)
- EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. (Level 3)
- EPA: Collaborate as a member of an IPE team. (Level 3)
- EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)
- EPA: Full-fill a medication order. (Level 3)
- 3.2a Patient Educator (Patient Educator): Educate patients and their caregivers by determining the most effective and enduring ways to impart information and assess understanding.
 - EPA: Minimize adverse drug events and medications in a population. (Level 2)
 - EPA: Maximize the appropriate use of medications in a population. (Level 2)
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)
- 3.2b Healthcare Professional Educator (Healthcare Professional Educator): Educate healthcare providers by determining the most effective and enduring ways to impart information and assess understanding.

- EPA: Minimize adverse drug events and medications in a population.
(Level 2)
- EPA: Maximize the appropriate use of medications in a population. (Level 2)
- EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)
- 3.6 Communication (Communicator): Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.
 - EPA: Collect information to identify a patient's medication-related problems and health-related needs. (Level 4)
 - EPA: Analyze information to determine the effects of medication therapy, identify medication-related problems, and prioritize health-related needs.
(Level 3)
 - EPA: Follow-up and monitor a care plan. (Level 3)
 - EPA: Collaborate as a member of an IPE team. (Level 3)
 - EPA: Identify patients at risk for prevalent disease in a population. (Level 3)
 - EPA: Minimize adverse drug events and medications in a population.
(Level 2)
 - EPA: Maximize the appropriate use of medications in a population. (Level 2)
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases. (Level 3)

- EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)
- EPA: Use evidence-based information to advance patient care. (Level 3)
- EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)
- EPA: Full-fill a medication order. (Level 3)

Role: Professionalism

Pharmacists are committed to the health and well-being of their patients, society, and themselves. This is demonstrated through ethical practice, high standards of personal behavior, accountability to the profession and society, and maintenance of their own personal health. Pharmacists serve essential roles in the healthcare team and society, as such, professional identity is central. This tenet includes promotion of the public good, adherence to high ethical and moral standards. It recognizes that to provide good quality patient care, they must take care of themselves and others in their profession.

- 4.1 Self-awareness (Self-aware): Examine and reflect on personal knowledge, skills, abilities, beliefs, biases, motivation, and emotions that could enhance or limit personal and professional growth.
 - EPA: Collaborate as a member of an IPE team. (Level 3)
 - EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)
 - EPA: Create a written plan for continuous professional development. (Level 3)
- 4.2 Leadership (Leader): Demonstrate responsibility for creating and achieving shared goals, regardless of position.
 - EPA: Collaborate as a member of an IPE team. (Level 3)

- EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)
- EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)
- 4.3 Innovation and Entrepreneurship (Innovator): Engage in innovative activities by using creative thinking to envision better ways of accomplishing professional goals.
 - EPA: Collaborate as a member of an IPE team. (Level 3)
 - EPA: Use evidence-based information to advance patient care. (Level 3)
 - EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)
- 4.4 Professionalism (Professional): Exhibit behaviors and values that are consistent with the trust given by the profession by patients, other healthcare providers, and society.
 - EPA: Collaborate as a member of an IPE team. (Level 3)
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)
 - EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)
 - EPA: Create a written plan for continuous professional development. (Level 3)

Role: Scholarship

Pharmacists are committed to excellence in their practice through life-long professional development, teaching others, developing new innovative practices that advance the profession, and using evidence-based medicine. Pharmacists are committed to finding and promoting drug and other health information that is evidence-based and

up-to-date. Pharmacists understand the importance of contributing to scholarship and evidence-based medical literature.

- 3.2 Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.
 - EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. (Level 3)
 - EPA: Identify patients at risk for prevalent disease in a population. (Level 3)
 - EPA: Minimize adverse drug events and medications in a population. (Level 2)
 - EPA: Maximize the appropriate use of medications in a population. (Level 2)
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases. (Level 3)
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 3)
- 3.6 Communication (Communicator): Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 3)
 - EPA: Use evidence-based information to advance patient care. (Level 3)

- 4.3 Innovation and Entrepreneurship (Innovator): Engage in innovative activities by using creative thinking to envision better ways of accomplishing professional goals.
 - EPA: Collaborate as a member of an IPE team. (Level 3)
 - EPA: Use evidence-based information to advance patient care. (Level 3)
 - EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)

Role: Systems-based Practice/Manager

Pharmacists are committed to safety and quality in health care, professional advocacy, health insurance, health care economics, health outcomes, quality improvement, transitions of care, public health, and patients' chronic care. Pharmacists understand that they work as part of a more extensive “system” of health care and that to provide good, quality care, they need to be able to coordinate care within the systems, provide treatment recommendations that work with the patients' insurance, and be an advocate for optimal and quality patient care. Pharmacists also need to advocate for the profession on professional roles/responsibilities and the ability to bill for services.

- 2.2 Medication use systems management (Manager): Manage patient healthcare needs using human, financial, technological, and physical resources to optimize the safety and efficacy of medication use.
 - EPA: Collect information to identify a patient’s medication-related problems and health-related needs. (Level 4)
 - EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective. (Level 3)

- EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. (Level 3)
- EPA: Follow-up and monitor a care plan. (Level 3)
- EPA: Identify patients at risk for prevalent disease in a population. (Level 3)
- EPA: Minimize adverse drug events and medications in a population. (Level 2)
- EPA: Maximize the appropriate use of medications in a population. (Level 2)
- EPA: Ensure that patients have been immunized against vaccine-preventable diseases. (Level 3)
- EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)
- EPA: Full-fill a medication order. (Level 3)
- 3.2 Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.
 - EPA: Minimize adverse drug events and medications in a population. (Level 2)
 - EPA: Maximize the appropriate use of medications in a population. (Level 2)
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)
- 3.6 Communication (Communicator): Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.

- EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)
- EPA: Full-fill a medication order. (Level 3)
- 4.2 Leadership (Leader): Demonstrate responsibility for creating and achieving shared goals, regardless of position.
 - EPA: Collaborate as a member of an IPE team. (Level 3)
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)
 - EPA: Oversee the pharmacy operations for an assigned shift. (Level 2)

Role: Collaborator

Pharmacists work with other healthcare professionals to provide safe, high-quality, evidence-based, and patient-centered care. Pharmacists understand that being able to function effectively in an interprofessional team is necessary to provide safe, high-quality, and patient-centered care. Collaboration is also important with the patient and their support systems. Collaboration requires trust, respect, and shared decision-making. It also requires the sharing of knowledge, perspectives, responsibilities, and the willingness to learn from others. To collaborate effectively, one must understand the roles of others on the team, articulate one's role on the team, be pursuing common goals, and manage conflict effectively.

- 3.1 Problem Solving (Problem Solver): Identify problems, explore and prioritize potential strategies, and design, implement, and evaluate a viable solution.
 - EPA: Collaborate as a member of an IPE team. (Level 3)
- 3.2 Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.

- EPA: Implement a care plan in collaboration with the patient, caregivers, and other health professionals. (No level – no consensus)
- EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)
- 3.4 Interprofessional collaboration (Collaborator): Actively participate and engage as a healthcare team member by demonstrating mutual respect, understanding, and values to meet patient care needs.
 - EPA: Follow-up and monitor a care plan. (Level 3)
 - EPA: Collaborate as a member of an IPE team. (Level 3)
 - EPA: Identify patients at risk for prevalent disease in a population. (Level 3)
 - EPA: Minimize adverse drug events and medications in a population. (Level 2)
 - EPA: Maximize the appropriate use of medications in a population. (Level 3)
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases. (Level 3)
- 3.6 Communication (Communicator): Effectively communicate verbally and nonverbally when interacting with an individual, group, or organization.
 - EPA: Collaborate as a member of an IPE team. (Level 3)
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)

Role: Advocate/Health Promoter

Pharmacists are committed to using their expertise and influence to work with patient populations to improve communities' health and wellness. They work to understand the needs, speak on behalf of others, and seek to mobilize resources to effect change when needed. Pharmacists understand that improving health is not limited to treating illness but also includes disease prevention, health promotion, and health protection. They understand their unique place in the healthcare team, and society allows them access to populations that others may not have. Pharmacists understand the need to work with patients to navigate complex medical situations to get the care they may need.

- 2.4 Population-based care (Provider): Describe how population-based care influences patient-centered care and influences the development of practice guidelines and evidence-based best practices.
 - EPA: Identify patients at risk for prevalent disease in a population. (Level 3)
 - EPA: Minimize adverse drug events and medications in a population. (Level 2)
 - EPA: Maximize the appropriate use of medications in a population. (Level 2)
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases. (Level 3)
- 3.2 Educator (Educator): Educate all audiences by determining the most effective and enduring ways to impart information and assess understanding.
 - EPA: Identify patients at risk for prevalent disease in a population. (Level 3)

- EPA: Minimize adverse drug events and medications in a population.
(Level 2)
- EPA: Maximize the appropriate use of medications in a population. (Level 2)
- EPA: Ensure that patients have been immunized against vaccine-preventable diseases. (Level 3)
- EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)
- 3.3 Patient Advocacy (Advocate): Assure that patients' best interests are represented.
 - EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective. (Level 3)
 - EPA: Collaborate as a member of an IPE team. (Level 3)
 - EPA: Minimize adverse drug events and medications in a population.
(Level 2)
 - EPA: Maximize the appropriate use of medications in a population. (Level 2)
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases. (Level 3)
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)

- 3.5 Cultural sensitivity (Includer): Recognize social determinants of health to diminish disparities and inequities in access to quality care.
 - EPA: Collect information to identify a patient's medication-related problems and health-related needs. (Level 4)
 - EPA: Establish patient-centered goals and create a care plan for a patient in collaboration with the patient, caregiver(s), and other health professionals that are evidence-based and cost-effective. (Level 3)
 - EPA: Identify patients at risk for prevalent disease in a population. (Level 3)
 - EPA: Minimize adverse drug events and medications in a population. (Level 2)
 - EPA: Maximize the appropriate use of medications in a population. (Level 2)
 - EPA: Ensure that patients have been immunized against vaccine-preventable diseases. (Level 3)
 - EPA: Educate patients and professional colleagues regarding the appropriate use of medication. (Level 4)
 - EPA: Use evidence-based information to advance patient care. (Level 3)

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Business Address

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LICENSURE

Pharmacy License	Michigan #5302034354	Dec 2002-present
Pharmacy License	Kentucky #011988	Aug 2000-present
Controlled Substance License	Michigan #5302034354	Dec 2002-Jun 2005

EDUCATION

Doctor of Philosophy	Educational Leadership and Organizational Development University of Louisville Louisville, KY	2016-2020
Doctor of Pharmacy Summa Cum Laude	University of Kentucky Lexington, Kentucky	1996-2000
Bachelor of Science Magna Cum Laude	Chemistry Major Milligan College Milligan College, Tennessee	1992-1996

POSTGRADUATE TRAINING

HealthCare Fellows Program	HealthEnterprisesNetwork Louisville, Kentucky	2008-2009
Specialty Residency	Ambulatory Care University of Kentucky Lexington, Kentucky Director: Aimee Adams, Pharm.D.	2001-2002
Residency	Pharmacy Practice University of Kentucky Lexington, Kentucky Director: Kelly Smith, Pharm.D.	2000-2001

CERTIFICATIONS

Basic Life Support Louisville, Kentucky	2017-present
Board Certified Pharmacotherapy Specialists (BCPS) American College of Clinical Pharmacy.	Dec 2002-present
Physical Assessment in Patient Care Management Nova Southeastern University. Ft. Lauderdale, Florida	Oct 2001
The Cooper Clayton Method to Stop Smoking Kentucky Cancer Program. Lexington, Kentucky	Aug 2001
Pharmacy-Based Immunization Program University of Kentucky. Lexington, Kentucky	Apr 1999
Basic Life Support Louisville, Kentucky	2003-2012
Dale Carnegie Training Course	May 2008
Advanced Cardiac Life Support Lexington, Kentucky	2000-2002
Scholarship of Teaching and Learning Program University of Kentucky. Lexington, Kentucky	2000-2002
Basic Life Support Lexington, Kentucky	1996-2002

PROFESSIONAL EXPERIENCE

Professor	Sullivan University College of Pharmacy and Health Sciences Louisville, KY	2013-present
Assistant Dean of Academic Affairs and Assessment	Sullivan University College of Pharmacy and Health Sciences Louisville, KY	2010-present
Assistant Dean of Academic Affairs	Sullivan University College of Pharmacy Louisville, KY	2008-2010
Chair	Clinical and Administrative Sciences Department Sullivan University College of Pharmacy Louisville, KY	2007-2008
Associate Professor	Sullivan University College of Pharmacy Louisville, KY	2007-2013
Associate Professor	Ferris State University Grand Rapids, MI	2006-2007
Assistant Professor	Ferris State University Grand Rapids, MI	2002-2006
Staff Pharmacist	University of Kentucky Clinic Lexington, Kentucky	2001-2002
Staff Pharmacist	University of Kentucky Chandler Medical Center Lexington, Kentucky	2000-2002
Pharmacy Intern	The Kroger Company Louisville, Kentucky	1994-2000

TEACHING

Sullivan University College of Pharmacy and Health Sciences

Lectures	Course	Academic Year
VARK, Mindset, & Grit Results Overview	PHR 5009: Development of the Student Pharmacist	2020-present
PharmD Program Outcomes	PHR 5009: Development of the Student Pharmacist	2019-present
How To Provide Good Evaluations and Do Self Evaluations	PHR 6606 Professional Seminar Course	2019-present
Getting Ready for the NAPLEX	PHR 6606 Professional Seminar Course	2019-present
Presentation I	PHR 5204: Communication and Collaborative Solutions	2008-present
Presentation II	PHR 5204: Communication and Collaborative Solutions (moved to PHR 6606 Professional Seminar Course in 2016-2017)	2008-present
Overview of Careers in Academia; Teaching Organizational Structure	PHR 6814: Learn to Teach	2013-2019
Writing Learning Objectives and Review of Bloom's Taxonomy	PHR 6814: Learn to Teach	2009-2019
Teaching to Target Learning Styles	PHR 6814: Learn to Teach	2009-2019
Generational Differences	PHR 6814: Learn to Teach	2009-2019
Presentation Delivery	PHR 6814: Learn to Teach	2009-2019
Peer Assessment; Self-Assessment	PHR 6814: Learn to Teach	2013-2019
Active Learning Techniques	PHR 6814: Learn to Teach	2013-2019
Professionalism	PHR 5000: Introduction to Pharmacy	2010-2015
Overview of Public Health	PCAS 519: Public Health Issues	2012-2014
True Experiments	PCAS 523/531: Research Design and Literature Evaluation I and II	2008-2009
Chapter 1: Definition and Concepts	PCAS 606: Clinical Laboratory	2011-2015

Chapter 3: Drug Interference with Test Results	PCAS 606: Clinical Laboratory	2011-2015
Chapter 9: Pulmonary Function Test	PCAS 606: Clinical Laboratory	2011-2013
Chapter 17: Rheumatic Diseases	PCAS 606: Clinical Laboratory	2011-2012
IBS/IBD	PCAS 609: Pharmacotherapeutics I	2010-2012
How to Write a Publishable Research Paper	PCAS 617: Pharmaceutical Debates on Recent Issues Affecting the Profession	2009-2011
Cerebrovascular Disease	PCAS 622: Pharmacotherapeutics II	2009-2010
Glaucoma	PCAS 633: Pharmacotherapeutics IV	2009-2010
Urinary Incontinence	PCAS 633: Pharmacotherapeutics IV	2009-2010
Precepted students for student research project	PCAS 700: Research Project	2010-2013
True Experiments	PCAS 523/531: Research Design and Literature Evaluation I and II	2008-2009

Course Coordination	Academic Year
PHR 6606: Professional Seminar	2019-present
PHR 5009: Development of Student Pharmacist	2016-present
PHR 5204: Communications and Collaborative Solutions	2019-2020
PHR 6814: Learn to Teach (Elective)	2010-2019
PCAS 519: Public Health Issues	2012-2014
PCAS 604: Landmark Trials I (elective)	2011-2012
PCAS 522: CAM/Self-Care	2009-2010
PCAS 536: Applied Therapeutics Lab I	2009-2010
PCAS 612: Pharmacotherapeutics I	2009-2010
PCAS 523/531: Research Design and Literature Evaluation I and II	2008-2009

Sullivan University College of Pharmacy and Health Sciences Master's in Physician Assistant

Lectures	Course	Academic Year
Poster Creation	PA 540: Principles of PA Practice IV	2017-2019

Grand Valley State University

Lectures	Course	Academic Year
Neuropharmacology	PT 643: Clinical Medicine III	2006-2007
Neurology Pharmacology	PAS 630: Clinical Rotations: Pharmacology for GVSU Physician Assistant Studies Program	2003-2004

Western Michigan University

Lectures	Course	Academic Year
Pulmonary Pharmacology	CTA 510: Clinical Pharmacology in Drug Development	2003-2004
Inflammation and Immune Modulation	CTA 510: Clinical Pharmacology in Drug Development	2003-2004
Anti-inflammatory Drugs	CTA 510: Clinical Pharmacology in Drug Development	2003-2004

Ferris State University

Lectures	Course	Academic Year
Introduction/Ethics/Professionalism/ Evaluation	PHPR 514: Clinical Communication	2004-2008
Presentation Style	PHPR 514: Clinical Communication	2004-2008
Know Your Audience/Active Learning	PHPR 514: Clinical Communication	2004-2008
Medication Histories	PHPR 514: Clinical Communication	2003-2008
Health Professional Communication	PHPR 514: Clinical Communication	2004-2005
GERD/ Peptic Ulcer Disease/ Stress Ulcers	PHPR 523/524: Pharmacotherapy	2002-2004
Drug-Induced GI Disease	PHPR 523/524: Pharmacotherapy	2002-2003
Supportive Care for the Cancer Patient	PHPR 523/524: Pharmacotherapy	2002-2003
Eye Products	PHPR 521/522: Pharmacotherapy	2002-2004
Stroke	PHPR 521/522: Pharmacotherapy	2002-2004
Student Patient Presentations	PHPR 501: Integrated Lab	2002-2004
Cardiovascular Lab	PHPR 501: Integrated Lab	2003-2004
Introduction to Basic Pharmacist Communication Skills	PHAD 310: The Profession of Pharmacy	2003-2004

Course Coordination	Academic Year
PHPR 602: Adult Ambulatory Care Medicine Clerkship	2002-2008
PHPR 514: Clinical Communication	2004-2008

University of Kentucky

Lectures	Course	Academic Year
Small Group Facilitator: Dyslipidemia and Hypertension	PHR 949: Contemporary Aspects of Pharmacy Practice IV	2001-2002
Small Group Facilitator: Surgical Prophylaxis/ Parenterals/ Diabetes	PHR 939: Contemporary Aspects of Pharmacy Practice III	2001-2002
Small Group Facilitator: Thyroid and Substance Abuse	PHR 929: Contemporary Aspects of Pharmacy Practice II	2000-2002
Small Group Facilitator: Otitis Media and UTIs	PHR 919: Contemporary Aspects of Pharmacy Practice I	2000-2002
Critical Care Clinical Pharmacology Group Facilitator	MD 842: Advanced Clinical Pharmacology and Anesthesiology	2000-2002
Congestive Heart Failure	PHR 895: Ambulatory Care Elective	2000-2001
Ocular Infections and Glaucoma	PHR 961: Integrated Therapeutics II	2001-2002
Hormone Replacement Therapy	PHR 961: Integrated Therapeutics II	2001-2002
Menopause	PHR 961: Integrated Therapeutics II	2000-2001
Smoking Cessation	PHR 923: Nutrition and Health Promotion	2001-2002
Top 200 Drug Review	PHR 939: Contemporary Aspects of Pharmacy Practice III	2001-2002
Ophthalmic Conditions	PHR 916: Non-Prescription Products and Supplies I	2001-2002

PRESENTATIONS

National

“Interprofessional Curriculum for the Care of Older Adults (ICCOA) to APPE Students. American Association of Colleges of Pharmacy Schools Poster. (Author) Jul 2020

“Nailed it! Doctor of Pharmacy Students’ Self-Awareness of Performance on Objective Structured Clinical Examinations (OSCE). American Pharmacists Association Virtual Poster Session. (Author)	Mar 2020
“Addressing Student Performance Concerns Through Effective Remediation Programs.” American Association of Colleges of Pharmacy Student Services Sig. Webinar. (Presenter)	Mar 2020
“Co-Curriculum Assessment Modalities Across Accredited Pharmacy Program.” American Association of Colleges of Pharmacy Assessment Sig. Webinar. (Moderator)	Nov 2019
“Practicing Understanding: Strategies to Orient Non-Practiced Faculty to the Pharmacy Profession and Professional Education”. American Association of Colleges of Pharmacy Annual Meeting. Platform Presentation. (Presenter)	Jul 2019
“Text Anxiety’s Effect on Performance: Managing the Power of the Mind”. American Association of Colleges of Pharmacy Annual Meeting. Platform Presentation. (Presenter)	Jul 2019
“Bridging the Great Divide: Characterizing Activities to Orient Non-Practice Faculty to the Pharmacy Profession”. American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. (Author)	Jul 2019
“Bridging the Gap Between Didactic and Experiential Learning”. American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. (Author)	Jul 2019
“Influence of Program Type, Curricular Delivery, and Demographics on Test Anxiety”. American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. (Author)	Jul 2019
“A Qualitative Study of Evaluating Pharmacy Faculty Perceptions on Empathy in Education”. American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. (Author)	Jul 2019
“How to support struggling students through effective remediation plans”. American Association of Colleges of Pharmacy Webinar. (Author)	Mar 2019
“Assessing Reliability and Validity of Advanced Pharmacy Practice Experience (APPE) Evaluations from One College of Pharmacy in the United States.” American Society of Health-Systems Pharmacist Annual Meeting. Poster Presentation. (Author)	Dec 2018

“ExamSoft Use as a Curricular Assessment and Learning Analytics Tool.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. (Author)	Jul 2018
“Student Perceptions of the PCOA – A Multi-institutional Sample”. American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. (Author)	Jul 2018
“PCOA Opportunities and Challenges: Two Sides of the Same Coin.” American Association of Colleges of Pharmacy Annual Meeting. Platform Presentation. (Presenter)	Jul 2018
“Fostering a Culture of Collaboration Using the Four Frames Model.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. (Author)	Jul 2018
“Pharmacy Expert Panel Webinar.” ExamSoft Webinar. (Author)	Apr 2018
“Predicting NAPLEX Success Utilizing Performance on Skills-based Assessment in the Patient Care Laboratory Setting.” American College of Clinical Pharmacy Meeting. Poster Presentation. (Author)	Oct 2017
“Using ExamSoft Data for Faculty Development.” ExamSoft Webinar. (Author)	Aug 2017
“Standard 4.1 and a Professional Development and Advising Plan for Student Achievement of Educational Outcomes.” Association of Colleges of Pharmacy Annual Meeting. Poster presentation. Nashville, TN. (Author)	Jul 2017
“Chicken or the egg? Exploring the link between assessment resources and culture of assessment.” Association for the Assessment of Learning in Higher Education Annual Meeting. Louisville, KY. (Author)	Jun 2017
“Use of ExamSoft data to prepare for and ease the accreditation process.” ExamSoft Webinar. (Author)	Apr 2017
“Understanding the structure, resources, and culture towards assessment in US schools of pharmacy.” Assessment Institute in Indianapolis Meeting. Platform presentation. Indianapolis, IN. (Author)	Oct 2016
“Predictors of NAPLEX Performance in an Accelerated Program.” American Association of Colleges of Pharmacy Annual Meeting. Poster presentation. Anaheim, CA. (Primary Author)	Jul 2016

“Creating an Arms Race? Examining School Costs and Motivations for Providing NAPLEX and PCOA Preparation. American Association of Colleges of Pharmacy Annual Meeting. Poster presentation. Anaheim, CA. (Author)	Jul 2016
“Continuum of Student Development: A 3 Tiered Approach in a 3 Year Program.” American Association of Colleges of Pharmacy Annual Meeting. Poster presentation. Anaheim, CA. (Primary Author)	Jul 2016
“Mini-Session: Preparation for NAPLEX and PCOA Exams: results of a National Study. American Association of Colleges of Pharmacy Annual Meeting. Platform presentation. Anaheim, CA. (Author)	Jul 2016
“Special Session: More Than Just Numbers: Providing Autonomy-Supportive Feedback to large Student Populations. American Association of Colleges of Pharmacy Annual Meeting. Platform presentation. Anaheim, CA. (Author)	Jul 2016
“Creation of Longitudinal Report Cards Using Assessment Data.” ExamSoft Annual Meeting. Platform presentation. Dallas, TX. (Co-Author)	Jun 2016
“Successful Didactic Course Remediation in an Accelerated Program.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. National Harbor, MD. (Co-Author)	Jul 2015
“Impact of a Landmark Trials Elective on Pharmacy Curriculum Outcomes Assessment (PCOA) Student Scores.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. National Harbor, MD. (Co-Author)	Jul 2015
“Evaluation of student and faculty perceptions on implementation of electronic assessments in an accelerated Doctor of Pharmacy Program.” American Pharmacist Association. Poster Presentation. San Diego, CA. (Co-Author)	Mar 2015
“A Curriculum Committee Toolkit for Addressing the 2013 CAPE Outcomes.” American Association of College of Pharmacy Webinar. Platform Presentation. Web. (Author)	Mar 2015
“Preparing Students for an Accelerated Pharm D Program At Sullivan University.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Grapevine, TX. (Co-Author)	Jul 2014

“Success Rate of Exam Remediation in a 3-Year Accelerated Program.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Kissimmee, FL. (Primary Author)	Jul 2012
“Use of NAPLEX to Validate SUCOP Benchmarking of Student Outcome Achievement.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Kissimmee, FL. (Primary Author)	Jul 2012
“A Prospective Evaluation of Group Presentation and Peer Review in a Critical Care Elective Course.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. San Antonio, TX. (Co- Author)	Jul 2011
“Survey results for exam remediation at US Colleges of Pharmacy.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. San Antonio, TX. (Primary Author)	Jul 2011
“Do HSRT exam results predict how well students will do in pharmacy Therapeutic courses?” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. San Antonio, TX. (Primary Author)	Jul 2011
“Course action plan impact on course outcomes.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. San Antonio, TX. (Co-Author)	Jul 2011
“Correlation of student self-assessment of program outcomes with course grade averages.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. San Antonio, TX. (Primary Author)	Jul 2011
“Comparison of HSRT results between students with degrees prior to pharmacy school versus only pre-requisites.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. San Antonio, TX. (Primary Author)	Jul 2011
“End of the Year Capstone Exam Descriptions”. American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. San Antonio, TX. (Primary Author)	Jul 2011
“Longitudinal Didactic Review Examinations During Advance Pharmacy Practice Experiences (APPE)”. American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. San Antonio, TX. (Primary Author)	Jul 2011

“Experience with an Exam Remediation Procedure in a 3-Year Accelerated Program.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Seattle, WA (Primary Author)	Jul 2010
“Tracking Performance of Sullivan University College of Pharmacy Students Using Pharmacy Curricular Outcomes Assessment (PCOA).” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Seattle, WA. (Co-Author)	Jul 2010
“Quantitative Measurement of Student Attainment of Sullivan University College of Pharmacy Program-level ABOs.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Seattle, WA. (Co-Author)	Jul 2010
“A Pilot Study to Evaluate Professionalism in a Pharmacy Curriculum.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Boston, MA. (Co-Author)	Jul 2009
“Does Examination Remediation Impact on Course Retention?” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Boston, MA. (Co-Author)	Jul 2009
“Sullivan University College of Pharmacy Bridge Program: IPPE to APPE.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Boston, MA. (Primary author)	Jul 2009
“Sullivan University College of Pharmacy NAPLEX and MPJE Preparation.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Boston, MA. (Primary author)	Jul 2009
“Faculty Satisfaction With the Student Self-Assessment of Program Outcomes Achievement System (RXOutcome) Process.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Boston, MA. (Primary author)	Jul 2009
“Student Self-Assessment of Program Outcomes Achievement.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Boston, MA. (Co-Author)	Jul 2009
“An Innovative Approach to the Development, Delivery, and Assessment of Informatics Course for a Newly Established Doctor of Pharmacy Program.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Chicago, Chicago, IL. (Co-Author)	Jul 2008

“Curricular Comparison of a New 3 Year Doctor of Pharmacy Degree Program vs Established Degree Programs.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Chicago, IL. (Co-Author)	Jul 2008
“Public Health Opportunities at a New Doctor of Pharmacy Program.” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. Chicago, IL. (Primary author)	Jul 2008
“Proton Pump Inhibitor Use by Hospital Inpatients as a Risk For Nosocomial Infection by <i>Clostridium difficile</i> .” American College of Physicians Meeting. Platform Presentation. Philadelphia, Pennsylvania. (Co-Author)	Apr 2006
“Mentoring Junior Faculty.” American Association of College of Pharmacy Annual Meeting. Poster Presentation. Cincinnati, Ohio. (Primary author)	Jul 2005
“Type 2 Diabetes in Children and Adolescents: Who’s To Blame?” Live on-line Pharmacy CE. Continuing Education for Pharmacists presentation. ContinuingEducation.com. ACPE Continuing Education approved. (written by Joan Rider, presented by me as an encore presentation)	Dec 2003
“Non-adherence With Multiple Sclerosis Therapies.” American College of Clinical Pharmacy Meeting. Poster Presentation. Savannah, Georgia. (Primary author)	Apr 2002
“Topiramate Use In Essential Tremors.” American Society of Health-System Pharmacists Midyear Clinical Meeting. Poster Presentation. New Orleans, Louisiana. (Primary author)	Dec 2001
“Idiopathic Paresthesia Reaction to Rofecoxib.” American Society of Health-System Pharmacists Annual Meeting. Poster Presentation. Los Angeles, California. (Primary author)	Jun 2001
“Pharmacist Intervention in the Management of Type 2 Diabetes: Does It Improve Glycosylated Hemoglobin and Blood Pressure Control?” American Association of Colleges of Pharmacy Annual Meeting. Poster Presentation. San Diego, California. (Primary author)	Jul 2000
“Why I Participated in the Novo-Nordisk Diabetes Project Grant Program.” American Association of Colleges of Pharmacy Annual Meeting. Platform Presentation. San Diego, California. (Sole author)	Jul 2000

“Pediatric Adaptation of Patient Education Leaflets for Anticonvulsant Medications.” Pediatric Advocacy Group Conference. Poster Presentation. Kiawah Island, South Carolina. (Primary author)	Oct 1998
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Regional

“Faculty Perceptions of Summative Assessments.” IUPUI Assessment Institute. Platform Presentation. Indianapolis, IN. (Primary Author)	Oct 2018
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“Teaching Recommendation and Patient Counseling Skills in a Self-Care Course to Allow Achievement of Competencies in Intermediate Pharmacy Practice Experiences.” Nonprescription Medicines Academy Annual Conference. Poster Presentation. Cincinnati, OH. (Co-Author)	Oct 2011
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“Selecting Appropriate Classroom Assessment Techniques Based on Teaching Goals Inventory (TGI)”. IUPUI Assessment Institute. Poster Presentation. Indianapolis. (Co-Author)	Oct 2008
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“Exploring Collaborations.” Kentucky Science and Technology Conference. Poster Presentation. Frankfort, KY. (Co-Author)	Apr 2008
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“Pharmacy Professionals’ Status in Kentucky.” Kentucky Science and Technology Conference. Poster Presentation. Frankfort, KY. (Co-Author)	Apr 2008
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“Facts and Fiction of Hormone Replacement Therapy.” Michigan Pharmacists Association Grand Escape 2007. Platform Presentation. Mackinac Island, Michigan. ACPE Continuing Education Approved. (Sole author)	Aug 2007
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“Patient Assessment, Self Monitoring, and Management.” Michigan Pharmacists Association Diabetes Care Certificate Program in Pharmacy. Platform Presentation. Grand Blanc, Michigan. ACPE Continuing Education Approved. (Co-Author)	Apr 2006
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“Hormone Replacement Therapy.” Michigan Pharmacists Association Education Vacation 2004. Platform Presentation. Traverse City, Michigan. ACPE Continuing Education Approved. (Sole author)	Aug 2004
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“Asthma Treatment in the Adult.” Michigan Pharmacists Association 2004 Annual Convention. Platform Presentation. Dearborn, Michigan. ACPE Continuing Education Approved. (Sole author)	Feb 2004
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“Late Complications in a 48-year old Male After Ingestion of Brodifacoum (DeCon) in a Suicide Attempt.” American College of Physicians Michigan Chapter Scientific Meeting. Poster Presentation. Acme, Michigan. (Last author)	Sep 2003
“Non-adherence With Multiple Sclerosis Therapies.” Southeast Resident Conference. Research Presentation. Athens, Georgia. ACPE Continuing Education Approved. (Primary author)	Apr 2002
“Pharmacist Intervention in the Management of Type 2 Diabetes: Does It Improve Glycosylated Hemoglobin and Blood Pressure Control?” Southeast Resident Conference. Research Presentation. Athens, Georgia. ACPE Continuing Education Approved. (Primary author)	Apr 2001

Local

“Planning for Engagement.” Sullivan University Faculty Retreat. Breakout Session. Louisville, KY. (Co-presenter)	Oct 2019
“What Effects Student Engagement and Why Should We Care?” Sullivan University Faculty Retreat. Keynote Platform Presentation. Louisville, KY. (Presenter)	Oct 2019
“Leadership for a Successful Merger.” University of Louisville Spring Research Conference. Platform Presentation. Louisville, KY. (Presenter)	Mar 2018
“How to Present a Research Poster.” Sullivan University College of Pharmacy Seminar Series. Platform Presentation. Louisville, KY. (Presenter)	Feb 2016
“Large Group Presentations.” Sullivan University College of Pharmacy Teaching Certificate Seminar. Platform Presentation. Louisville, KY. (Presenter)	Aug 2015
“Question Writing.” Sullivan University College of Pharmacy Teaching Certificate Seminar. Platform Presentation. Louisville, KY. (Presenter)	Jul 2015-2019
“Learning Objectives and Active Learning.” Sullivan University College of Pharmacy Teaching Certificate Seminar. Platform Presentation. Louisville, KY. (Presenter)	Jul 2015-2019
“Objectives and Writing Good Assessments.” Sullivan University College of Pharmacy Teaching Certificate Seminar. Platform Presentation. Louisville, KY. (Presenter)	Jul 2014

“Learning Styles.” Sullivan University College of Pharmacy Teaching Certificate Seminar. Platform Presentation. Louisville, KY. (Presenter)	Jul 2014
“Learning Objectives: Making Sure it Links.” Sullivan University Faculty Retreat. Platform Presentation. Florence, IN. (Presenter)	Nov 2012
“Writing Objectives and Quality Examinations Questions.” Kentucky Pharmacy Residency Network Summer Meeting. Platform Presentation. Louisville, KY. (Co-presenter)	Jul 2011
“College of Pharmacy Takes Center Stage.” Sullivan University Faculty Retreat. Panel Discussion. Florence, IN. (Co-presenter)	Nov 2010
“Update on the Treatment of C. Diff.” Kentucky Society of Health-System Pharmacy Spring Meeting. Platform Presentation. Louisville, KY. (Presenter)	May 2010
“Pharmacy 101”. Sullivan University Faculty Retreat. Platform Presentation. Florence, IN. (Co-presenter)	Nov 2009
“How to Start a Clinical Practice Site.” Sullivan University College of Pharmacy Faculty Development. Platform Presentation. Louisville, KY. (Co-presenter)	May 2009
“Teaching Philosophies, Writing Objectives, Teaching Dos and Don’ts, and Writing Test Questions.” Sullivan University College of Pharmacy Faculty Development. Platform Presentation. Louisville, KY. (Co-presenter)	Dec 2008
“Pharmacy Practice.” Marion County Area Technology Center Students. Platform Presentation. Louisville, KY. (Co-presenter)	Dec 2008
“Small Group Teaching.” Ferris State University Resident Teaching Seminar. Platform Presentation (encore). Grand Rapids, MI. (Co-presenter)	Sept 2007
“Backward Course Design.” Ferris State University Resident Teaching Seminar. Platform Presentation. Grand Rapids MI. (Co-presenter)	May 2007
“Small Group Teaching.” Ferris State University Resident Teaching Seminar. Platform Presentation (encore). Grand Rapids, MI. (Co-presenter)	Jan 2007

“Small Group Teaching.” Ferris State University Resident Teaching Seminar. Platform Presentation. Grand Rapids, MI. (Co-presenter)	Jun 2006
“Utilization of BMI in Diagnosing Obesity at an Outpatient Clinic.” GRMERC’s Community Health Research Day. Platform Presentation. Grand Rapids, Michigan. (Co-Author)	Apr 2006
“Proton Pump Inhibitor Use by Hospital Inpatients as a Risk For Nosocomial Infection by <i>Clostridium difficile</i> .” GRMERC’s Community Health Research Day. Platform Presentation. Grand Rapids, Michigan. (Co-Author)	Apr 2006
“Non-adherence With Multiple Sclerosis Therapies.” University of Kentucky Chandler Medical Center. Southeastern Residency Conference Practice. Platform Presentation. Lexington, Kentucky. (Primary author)	Apr 2002
“Ziprasidone HCl In-service.” Eastern State Hospital. Nursing In-service. Platform Presentation. Lexington, Kentucky. (Co-Author)	Nov 2001
“Non-adherence To Multiple Sclerosis Therapies.” University of Kentucky Chandler Medical Center. Pharmacy Grand Rounds. Platform Presentation. Lexington, Kentucky. ACPE Continuing Education Approved. (Primary author)	Oct 2001
“Patient Noncompliance With Interferon Beta-1a, Interferon Beta-1b, and Glatiramer Acetate.” University of Kentucky Chandler Medical Center. Research Presentation. Lexington, Kentucky. (Primary author)	Oct 2001
“Treatment of Vasomotor Symptoms of Menopause.” University of Kentucky Chandler Medical Center. Pharmacy Grand Rounds. Lexington, Kentucky. (Sole author)	Jul 2001
“Pharmacist Intervention in the Management of Type 2 Diabetes: Does It Improve Glycosylated Hemoglobin and Blood Pressure Control?” University of Kentucky Chandler Medical Center. Resident Seminar Series. Lexington, Kentucky. ACPE Continuing Education Approved. (Primary author)	Mar 2001
“Idiopathic Paresthesia Reaction Associated With Rofecoxib.” University of Kentucky Chandler Medical Center. Resident Report. Lexington, Kentucky. (Primary author)	Jan 2001
“Vancomycin Ototoxicity.” University of Kentucky Chandler Medical Center. Resident Report. Lexington, Kentucky. (Sole author)	Oct 2000

- “Pharmacist Intervention in the Management of Type 2 Diabetes: Does It Improve Glycosylated Hemoglobin and Blood Pressure Control?” Oct 2000
University of Kentucky Chandler Medical Center. Research Presentation. Lexington, Kentucky. (Primary author)
- “Cancer Pain Management.” University of Kentucky Chandler Medical Center. Medical In-service. Lexington, Kentucky. (Sole author) Sept 2000
- “Prevention of Post Operative Atrial Fibrillation.” University of Kentucky Chandler Medical Center. Pharmacy In-service. Lexington, Kentucky. (Sole author) Aug 2000
- “Smoking Cessation.” University of Kentucky Chandler Medical Center. Nursing In-service. Lexington, Kentucky. (Sole author) Apr 2000
- “Diabetes.” University of Kentucky College of Pharmacy. Robinson Forest Scholars Program. Lexington, Kentucky. (Sole author) Jul 1999

PUBLICATIONS

Peer-Reviewed

Palmer EC, Esposito ER, Shin M, Raake SE, Malcom DR, and **Daugherty KK**. Impact of Intersession Course Remediation on NAPLEX/PCOA Scores in an Accelerated Doctor of Pharmacy Program. *American Journal of Pharmaceutical Education*. 2020;84(9):ajpe7827.

Daugherty KK and Malcom DR. Assessing the relationship among PCOA performance, didactic academic performance, and NAPLEX scores. *American Journal of Pharmaceutical Education*. 2020; 84(8):ajpe847712.

Rudolph J, Gortney JS, Brownfield, A, Caldwell D, Castleberry A, Le UM, Medina MS, Sease JM, Trujillo J, Welch AC, and **Daugherty KK**. Student perceptions of the utility of the Pharmacy Curriculum Outcomes Assessment. *Currents in Pharmacy Teaching and Learning*. 2020;12(3):255-264.

Daugherty KK and Elder KG. Program evaluation of a pharmacy run resident teaching and learning curriculum. *Currents in Pharmacy Teaching and Learning*. 2020;12(2):163-173.

Gregory, DF, Boje, KM, Carter RA, **Daugherty KK**, Hagemeyer, NE, Munger MA, Umland EM, Wager JL. Leading Change in Academic Pharmacy: Report of the 2018-2019 AACP Academic Affairs Committee. *American Journal of Pharmaceutical Education*. 2019;83(10):7661

Daugherty KK. ARCS motivation model application in a pharmacy elective. *Currents in Pharmacy Teaching and Learning*. 2019;11(12):1274-1280

Esposito ER, Palmer EC, Douglass AR, Malcom DR, Cox AG, Raake SE, & **Daugherty KK.** Intersession Remediation to Minimize Attrition in a Three-Year Pharmacy Program. *American Journal of Pharmaceutical Education*. 2019; 83(9): Article 7326.

Rudolph MJ, **Daugherty KK,** Ray ME, Shuford VP, Lebovitz L, & DiVall MV. Best practices on exam item construction and post-hoc review. *American Journal of Pharmaceutical Education*. 2019; 83(7): Article 7204. Paper won the AACP Assessment Special Interest Group 2020 Collaborative Publication Award

Burris, JN, Frederick EK, Malcom, DR, Raake, S, Shin, M, and **Daugherty KK.** Impact of a Journal Club Elective Course on Student Learning Measures. *American Journal of Pharmaceutical Education*. 2019;83(7): Article 6827.

Elder KG, **Daugherty KK,** & Malcom D. Predicting NAPLEX scores using student performance in the clinical skills laboratory setting. *Currents in Pharmacy Teaching and Learning*. 2019;11(7): 686-695

Lee KC, Rudolph MJ, Assemi M, Bray BS, **Daugherty KK,** ... Weck MA. Factors associated with cultures of assessment at US schools and colleges of pharmacy. *Currents in Pharmacy Teaching and Learning*. 2019;11(2): 129-138. Paper won the AACP Assessment Special Interest Group 2019 Collaborative Publication Award

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Dasgupta R, Meriwether K, **Daugherty KK**, Bhullar S, Shoemaker A, Summerfelt T. Utilization of BMI in Diagnosing Obesity at an Outpatient Clinic. *Southwest Michigan Medical Journal*. 2006;3(2):22-28.

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Book Chapters

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Abstracts

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Stowe CD, Wade S, Soja WD, English DE, Cox AG, Nash JD, Stutz MM, **Daugherty KK**, Malcom DR. Fostering a Culture of Collaboration Using the Four Frames Model. *American Journal of Pharmaceutical Education*. 2018; 82(5): Article 7160.

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Daugherty KK, Tran H. Use of NAPLEX to Validate SUCOP Benchmarking of Student Outcome Achievement. *American Journal of Pharmaceutical Education*. 2012;76(5):99.

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Daugherty KK, Pathak YV, Bodenberg M, Soja W, Facione FP, Stutz M, Stephens E, Sumanaskera W, Hughes CF, Kenney L, Claypool T, Downing C, Tran HT. Sullivan University College of Pharmacy Bridge Program: IPPE to APPE. *American Journal of Pharmaceutical Education*. 2009;73(4):57.

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Clark DB, **Daugherty KK**, Byrnes HL, Leist ER, Huynh H. Student Self-Assessment of Program Outcomes Achievement. *American Journal of Pharmaceutical Education*. 2009;73(4):57.

Daugherty KK, All Sullivan University College of Pharmacy Faculty. Public Health Opportunities at a New Doctor of Pharmacy Program. *American Journal of Pharmaceutical Education*. 2008;72(3):72.

Koomer A, Clark DB, Wessel HL, Facione F, Pathak Y, **Daugherty KK**, Tran H. Curricular Comparison of New 3 Year Doctor of Pharmacy Degree Program vs. Established Degree Programs. *American Journal of Pharmaceutical Education*. 2008;72(3):72.

Ansong MA, Tran HT, Koomer A, **Daugherty KK**. An Innovative Approach to the Development, Delivery, and Assessment of an Informatics Course for a Newly Established Doctor of Pharmacy Program. *American Journal of Pharmaceutical Education*. 2008;72(3):72.

Dasgupta R, Meriweather K, **Daugherty KK**, Shoemaker A, Summerfelt W. Proton Pump Inhibitor Use by Hospital Inpatients as a Risk For Nosocomial Infection by *Clostridium difficile*. American College of Physicians Research and Clinical Vignette Competition Abstracts; April 2006.

Daugherty KK and de Voest. Mentoring Junior Faculty. *American Journal of Pharmaceutical Education*. 2005;69(3):60.

Daugherty KK and Ryan M. Non-adherence With Multiple Sclerosis Therapies. Program and Abstracts of the Thirty-Third Annual Southeastern Residency Conference; April 2002.

Daugherty KK, Ryan M. Non-adherence With Multiple Sclerosis Therapies. American College of Clinical Pharmacy Spring Practice and Research Forum; April 2002

Daugherty KK, Gora-Harper ML. Idiopathic Paresthesia Reaction to Rofecoxib. American Society of Health-System Pharmacists Annual Meeting; June 2001.

Daugherty KK, Adams AG, Rudy D. Pharmacist Intervention in the Management of Type 2 Diabetes: Does It Improve Glycosylated Hemoglobin and Blood Pressure Control? Program and Abstracts of the Thirty-Second Annual Southeastern Residency Conference; April 2001.

Daugherty KK, Adams AG. Pharmacist Intervention in the Management of Type 2 Diabetes: Does It Improve Glycosylated Hemoglobin and Blood Pressure Control? American Association of Colleges of Pharmacy Annual Meeting; July 2000.

Daugherty KK, Kuhn RJ. Pediatric Adaptation of Patient Education Leaflets for Anticonvulsant Medications. Pediatric Pharmacy Advocacy Group Conference; October 1998.

PROFESSIONAL ACTIVITIES

College or Clinical

AALHE Grand Challenges Working Group – “Using assessment findings to direct immediate pedagogical improvement.”	2020
AALHE Grand Challenges Working Group – “Examining changes in institutional effectiveness over time”	2020
Co-Coordinator for the SUCOPHS Residency Teaching Certificate Program	2017-current 2010-2014
ACPE Site Visit	Mar 2017 May 2013
ACPE Site Team Reviewer Training	July 2016 Oct 2011

Oversee Director of Sullivan University College of Pharmacy Pharmacy Technician Program	2008-2011
Manned AACP recruiting booth at the ACCP Annual Meeting. Louisville, KY	Oct 2008
Spectrum Health Academic Pharmacy Resident Rotation Preceptor Spectrum Health Butterworth Hospital Grand Rapids, MI	2005-2007
Ferris State Ambulatory Care Faculty Academic Medicine Associates Grand Rapids, MI	2002-2007
Ferris State University College of Pharmacy Professional Development Track (co-coordinator)	2004-2007
Ferris State University Optometry Clinic Pharmacy Mentor	Jan-Feb 2007
Patient Assistance Program Advisory Council Member Grand Rapids, MI	2004-2005
Reviewer for "Psychotherapeutics For Nurses: Nursing Orientation." Eastern State Hospital Lexington, Kentucky	2001
<i>Roundtable Leader</i>	Jul 2005
"Preparing Ph.D. Students, Residents, and Fellows for Faculty Positions." American Association of Colleges of Pharmacy. Roundtable Discussion. Cincinnati, Ohio. (Leader)	Jul 2004
"Assessing Professional Behaviors/Ethical Reasoning." American Association of Colleges of Pharmacy Annual Meeting. Curriculum SIG/PEP SIG Roundtable Discussion. Salt Lake City, Utah. (Leader)	Jul 2004
"Mentoring Junior Faculty." American Association Of Colleges Of Pharmacy Annual Meeting. Roundtable Discussion. Salt Lake City, Utah. (Co-Leader)	Jul 2004
<i>State or National Leadership Positions</i>	
Kentucky HealthCare Fellows Board Member	2009-2012

Kentucky Society of Health System Pharmacists House of Delegates Member	2011
Kentucky Society of Health System Pharmacists Board Member	2008-2010
Michigan Pharmacist Association Education Committee Chair	2005-2007
<i>Reviewer Activities</i>	
ACCP Foundation Futures Grants Junior Investigator	2020
Leading Fellows Postdoc Programme Review	Apr 2018
Journal of Assessment Institutional Effectiveness	2018-present
Currents in Pharmacy Teaching and Learning	2012-present
Kentucky Pharmacist Association	2011-present
Scientific Journals International (SJI)	2008-present
American Journal of Pharmaceutical Education (AJPE) – Top Reviewer in 2019	2005-present
American Journal of Health-System Pharmacy (AJHP)	2005-present
Pharmacotherapy	2003-2019
Michigan Pharmacist	2002-2019
The Annals of Pharmacotherapy	2001-2019
ASHP Research And Education Foundation New Investigator Research Grant Reviewer	2013-2018
APhA Foundation Incentive Grant Reviewer	2011-2017 2019-2020
Remington’s Case Reviewer	2011
American Educational Research Association Division H Best Paper	2019-2020
American Educational Research Association Annual Meeting Reviewer	2018-2019 2019-2020

American Association of Colleges of Pharmacy Annual Meeting Abstract Reviewer	2012-2020 2009-2010
American Pharmacist Association Annual Meeting Abstract Reviewer	2008-2009
University Health-System Consortium Monographs	2005-2007
Book Review: Van Ornum M. "Electronic Prescribing: A Safety and Implementation Guide"	Aug 2007
Pharmat Reviewer	Jan 2007 Dec 2006
AACP New Investigator Program Grant Reviewer	2017-2019 2012-2015 2008 2006
GRMERC Research Day Abstracts	2006-2007
GRMERC Research Day Judge Grand Rapids Medical Education and Research Center Grand Rapids, MI	2003-2007
Pharmacotherapy Self-Assessment Program 5 th Edition	Apr 2004
<u>Exam Writer Activities</u>	
Board of Pharmaceutical Specialties Item Development Workshop Attendee	Apr 2005 Feb 2004
Pharmacotherapy Specialty Certification Examination Question Writer	Aug 2013 Feb 2007 Dec 2005 Dec 2004 Dec 2003

RESESARCH ACTIVITES

"Veterinary Medicine Assessment Paper." (Author). 2020. In progress.

"Metacognition and Authentic Assessments." (Author). 2019. In progress.

“Definition of Practice-readiness in pharmacy.” (Dissertation). 2019. In progress.

“Orientation of non-pharmacy faculty to pharmacy”. (Author). 2019. In progress. Poster and platform presented at AACP Annual Meeting in 2019. Paper submitted to *Currents in Pharmacy Teaching and Learning*.

“Empathy in pharmacy faculty.” (Author). 2019. In progress. Poster presented at AACP Annual Meeting in 2019. Paper submitted to *AJPE*.

“Student perceptions of the PCOA examination.” (Lead Author). 2017. In progress. Platform and poster presentation presented at the AACP Annual meeting in 2018. Paper published in *Currents in Pharmacy Teaching and Learning*.

“Student test anxiety.” (Author). 2017. In progress. Platform and poster presented at the AACP Annual meeting in 2019. Paper submitted to *AJPE*.

“Assessment Personal.” 2015. (Co-investigator). Platform presentation at IUPUI Assessment Conference 2016 and AAHLE Conference in 2017. Published as two publications in *Currents in Pharmacy Teaching and Learning*.

“NAPLEX Preparations.” 2015. (Co-investigator). Accepted for presentation as a platform and poster at 2016 AACP Annual meeting. Accepted as a publication in *American Journal of Pharmaceutical Education*.

“Course remediation success.” 2015. (Co-investigator). Poster presented at 2015 AACP annual meeting.

“Landmark Trials elective students’ PCOA scores versus Non-elective students.” 2015. (Co-investigator). Poster presented at 2015 AACP annual meeting. Paper accepted for publication in *American Journal of Pharmaceutical Education*.

“Use of Standardized Exam to Standardize Advanced Pharmacy Practice Experiences.” 2014. (Co-investigator). Published in *AACP Experiential Education Section Newsletter*. 2014;2.

“Preparing Students for an Accelerated PharmD Program at Sullivan.” 2014. (Co-investigator). Poster presented at 2014 AACP Annual Meeting. Publication submitted to *AJPE* (June 2015).

“Sensitivity and Specificity of Academic Progression and Ethics Reports.” Sullivan University College of Pharmacy. 2013. (Co-investigator). Publication in *Currents in Pharmacy Teaching and Learning*.

“Success Rate of Exam Remediation in a 3-Year Accelerated Program.” Sullivan University College of Pharmacy. 2012. (Co-investigator). Poster presented at 2012 American Association of Colleges of Pharmacy meeting.

“Use of NAPLEX to Validate SUCOP Benchmarking of Student Outcome Achievement.” Sullivan University College of Pharmacy. 2012. (Co-investigator). Poster presented at 2012 American Association of Colleges of Pharmacy meeting.

“Student Self-Assessment of Program Outcomes versus course GPAs.” Sullivan University College of Pharmacy. 2010. (Co-investigator). Poster presented at 2011 American Association of Colleges of Pharmacy meeting.

“Health Science Reasoning Test (HSRT) results for students with a previous degree vs. those with no previous degree” Sullivan University College of Pharmacy. 2010. (Co-investigator). Poster presented at 2011 American Association of Colleges of Pharmacy meeting.

“Health Science Reasoning Test (HSRT) data correlated to therapeutic course grades.” Sullivan University College of Pharmacy. 2010. (Co-investigator). Poster presented at 2011 American Association of Colleges of Pharmacy meeting.

“National Survey of Colleges of Pharmacy Remediation Plans.” Sullivan University College of Pharmacy. 2010. (Co-investigator). Poster presented at 2011 American Association of Colleges of Pharmacy meeting.

“The Usage of Course Evaluations to Improve the Curriculum of Professional Year 1 at the Newly Established Sullivan University College of Pharmacy.” 2010 (Co-investigator: student project). Poster presented at 2011 American Association of Colleges of Pharmacy meeting.

“Does Remediation Predict Retention in a 3-Year School?” Sullivan University College of Pharmacy. 2010 (Co-investigator). Poster presented at 2010 American Association of Colleges of Pharmacy meeting.

“Examination Remediation at a 3-Year School” Sullivan University College of Pharmacy. 2010 (Co-investigator).

“Faculty Satisfaction with the Student Self-Assessment of Program Outcomes Achievement System (RXOutcomes).” Sullivan University College of Pharmacy. 2009 (Co-investigator). Poster presented at 2009 American Association of Colleges of Pharmacy meeting.

“3 year versus 4 year College of Pharmacy curriculums.” Sullivan University College of Pharmacy. 2007 (Co-investigator) Poster presented at 2008 AACP meeting.

“Consumer Perceptions of the Pharmacists’ Role in Healthcare”. Ferris State University. 2007 (Co-investigator).

“Obesity Diagnosis and Management in a Residency Practice.” Spectrum Health Internal Medicine Residency Practice. Grand Rapids, Michigan. 2005 (Investigator) Publication accepted.

“PPIs and Risk for C. Diff.” Spectrum Health Hospital. Grand Rapids, Michigan. 2005 (Investigator). Results presented at the American College of Physicians Meeting and GRMERC’s Community Health Research Day in April 2006. Publication accepted.

“Cardiovascular Goal Attainment Project”. Academic Medicine Associates. Grand Rapids, Michigan. 2005 (Investigator; Project sponsored through Pfizer). Publication accepted.

“Mentoring.” Ferris State University. Big Rapids, Michigan. 2004. (Co-investigator). Initial results presented at the American Association of Colleges of Pharmacy Annual Meeting in July 2005.

“Enhancing Pharmacists’ Recommendation Process in an Internal Medicine Resident Clinic.” Spectrum Health Internal Medicine Residency Practice. Grand Rapids, Michigan. 2003 (Primary investigator). Publication accepted.

“Factors Leading Patients to Discontinue Multiple Sclerosis Therapies.” University of Kentucky Chandler Medical Center, Resident Project. Lexington, Kentucky. 2001-2002. (Primary investigator). Publication accepted.

“Essential Tremor Treated with Topiramate: A Case Series.” University of Kentucky Chandler Medical Center. Lexington, Kentucky. 2001-2002. (Investigator). Publication accepted.

“Correlation Between Saliva and Serum Levels of Antiepileptic Drugs.” University of Kentucky Chandler Medical Center, Resident Project. Lexington, Kentucky. 2001-2002. (Investigator). Acknowledgement in the following publication: Ryan M, Grim SA, Miles MV, et al. Correlation of Lamotrigine Concentrations Between Serum and Saliva. *Pharmacotherapy*. 2003;23(12):1550-1557.

GRANTS

“Formation of a Student Society of Health-System Pharmacy at the Sullivan University College of Pharmacy, a New Doctor of Pharmacy Program, in Louisville, KY. 2008-2009. Funded by ASHP Student Society Development Seed Grant Program. (\$500). (Investigator)

“A Study of Patient Noncompliance with Interferon Beta 1a, Interferon Beta 1b, and Glatiramer Acetate.” University of Kentucky Chandler Medical Center, Resident Project. Lexington, Kentucky. 2001-2002. Funded by Teva Pharmaceuticals (\$500). (Principal Investigator).

“Pharmacist Intervention in the Management of Type 2 Diabetes: Does It Improve Glycosylated Hemoglobin and Blood Pressure Control?” University of Kentucky Chandler Medical Center, Resident Project. Lexington, Kentucky. 1999-2001. Funded (1999-2000) by Novo Nordisk Pharmacy Practice Diabetes Program Grant (\$6000). (Principal Investigator).

COMMITTEE INVOLVEMENT

Sullivan University

Student Information System Taskforce (member)	2020-current
Academic Council (member)	2015-current
Planning and Evaluation Coordinating Council (PECC) (member)	2013-current
Academic Terms Research Project –Faculty Committee (member)	2019
LMS Taskforce (member)	2015
SACS-COC Steering Committee (member)	2014-2015

Sullivan University College of Pharmacy and Health Sciences

SU COPHS Planning and Assessment Committee (member)	2015-present
Curriculum Committee (Ex-officio member)	2013-present
Executive Committee (member)	2007-present
SU COPHS Dean Search Committee (member)	2019
E-portfolio Task Force (Chair)	2014-2017
Accreditation (member)	2007-2015
Promotion Review Committee (member)	2013-2015
Sullivan University Physician Assistant Program Advisory Committee (member)	2013
Sullivan University Physician Assistant Program Accreditation Committee (member)	2013
Graduate Program Steering Committee (member)	2013
InterProfessional Task Force (Chair)	2013
Campus Vue Task Force (member)	2012-2013
ACE Competency Task Force (member)	2010-2013
Program Assessment Committee (Chair)	2009-2011
Pharmacy Technician Advisor Board (member)	2007-2009
APEC (member)	2007-2009
Faculty Development/Retention (member)	2007-2009
Curriculum Committee (chair)	

Ferris State University Pharmacy Practice Department

Department Mission Statement Revision Committee	2007
Lecture Lottery Committee	2006
	2003-2004

Internal Medicine (Spectrum Health Position) Search Committee (member)	2002-2004
Drug Information/IT Position Committee (member)	
<i>Ferris State University College of Pharmacy</i>	
	2005-2007
Continuing Education Committee (member)	2005-2007
Accreditation Committee (member)	2005
English in the Curriculum Subcommittee (member)	2002-2005
Curriculum Committee (secretary-2002-Mar 2004)	2003-2004
MBA/PharmD Subcommittee (member)	
<i>Ferris State University Senate</i>	2003-2006
Diversity Committee	
<i>Professional</i>	
AALHE: Grand Challenges: Using Assessment Findings to Direct Immediate Pedagogical Improvement Taskforce	2020-present
AAHLE Grand Challenges: Change Over Time Taskforce	2020-present
AACP Assessment Sig Chair-elect, Chair, Past-Chair	2019-present
AACP Assessment Sig Research Sub-Committee (Co-Chair)	2017-present
AACP Assessment Sig Executive Council (member)	2017-present
AACP Assessment Sig Research Sub-Committee (Co-Chair)	2017-2019
AACP Academic Affairs Committee (member)	2018-2019
Kentucky Pharmacy Education and Research Foundation Advisory Council (member)	2014-2017
AACP Council of Dean's Conflict of Interest Policy and Practice Task Force	2014-2015
AACP Curriculum Sig CAPE Paper Taskforce (member)	2014-2015
KSHP Board (member)	2008-2010
AACP Pharmacy Practice Section Pharmacy Leadership Development Task Force (member)	2009-2010
AACP Pharmacy Practice Section Program Committee (member)	2008-2009
AACP New Investigator Grant Task Force (member)	Nov 2008
Michigan Pharmacists Association Education (member; Chair 2005-2007)	2003-2007
AACP Nominating Committee	2004-2005
KSHP Professional Affairs (member)	2000-2002
<i>University of Kentucky Residency</i>	
Residency Program Secretary	2001-2002
Pharmacy Grand Rounds (member)	2001-2002
Medication Use Evaluation Subcommittee Of Pharmacy and Therapeutics (member)	2001-2002
Drug Information Director Search Committee (member)	2001-2002

Residency Recruitment (1 st year-member; 2 nd year-co-chair)	2000-2002
Kentucky Konnection (editor)	2000-2002

University of Kentucky College of Pharmacy

College of Pharmacy Admissions (member)	2000-2001
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PROFESSIONAL MEMBERSHIPS

American Educational Research Association (AERA)	2017-present
Association for the Assessment of Learning in Higher Education (AALHE)	2015-present
Phi Lambda Sigma (PLS)	2013-present
Jefferson County Pharmacist Association (JCAP)	2008-present
Kentucky Pharmacists Association (KPhA)	2007-present
American Association of Colleges of Pharmacy (AACP)	2002-present
American College of Clinical Pharmacy (ACCP)	2000-present
Rho Chi	1998-present
Kentucky Society of Health-System Pharmacists (KSHP)	2007-2017
American Pharmacists Association (APhA)	2000-2018
Western Michigan Society of Health-System Pharmacists (WMSHP)	2002-2007
Michigan Society of Health-System Pharmacists (MSHP)	2002-2007
Michigan Pharmacists Association (MPA)	2001-2002
American Society of Health-System Pharmacists (ASHP)	2000-2002
Kentucky Pharmacists Association (KPhA)	1996-2002
Kentucky Society of Health-System Pharmacists (KSHP)	1996-2000
Kentucky Academy of Student Pharmacists	

LEADERSHIP SEMINARS

ACPE Self-Study Workshop	Aug 2015
Student Suicides and Suicide Threats for Colleges: Expectations, Risks, and Responses	Aug 2013
ACPE Standards 2007 Update Webinar	Feb 2012
ACPE Reviewer Training	Oct 2011
American Association of Colleges of Pharmacy Leadership Seminar (attendee)	Jul 2008

TEACHING SEMINARS

AACP Teacher's Seminar: Inclusive Teaching – A Strategy to Reach ALL Learners. (attendee)	Jul 2020
AACP Scholarship of Teaching and Learning Institute (team leader)	Nov 2017
AACP Teacher's Seminar: Learning is NOT a Spectator Sport: Active Learning in Pharmacy Curricular. (attendee)	Jul 2017
AACP Teacher's Seminar: Beginning With the End in Mind: Developing the Self-Aware Pharmacist. (attendee)	Jul 2015
AACP CAPE Institute. Leesburg, VA. (Team Leader)	May 2014
Exam Soft. "Making the Most From Reporting for Students and Institutions." Webinar. (attendee)	Mar 2014
Exam Soft Training. Sullivan University College of Pharmacy. (attendee)	Nov-Dec 2013
Faculty Retreat. Sullivan University. (attendee)	Nov 2013
Faculty Development: Curriculum Mapping 101. (Presenter)	Sept 2013
Faculty Development: Panopto Usage and other IT Questions. (attendee)	Apr 2013
Faculty Development: Portal to Portal: Library/DIC Resources for You. (attendee)	Mar 2013
Faculty Retreat. Sullivan University. (presenter and attendee)	Nov 2012
Spring 2012 KACCS Education Conference. Sullivan University Lexington Campus. (attendee)	Apr 2012
Faculty Retreat. Sullivan University. (attendee)	Nov 2011
Faculty Development: How to Write Great Test Questions; Sullivan University College of Pharmacy. (attendee)	July 2011
Web Seminar: Competency Based Education and Performance Assessment: WGU's Model for Success	Feb 2010

Education Scholar: Teaching Excellence and Scholarship Development Resources for Health Professions Educators Modules (7 modules)	Dec 2010
Faculty Retreat; Sullivan University (attendee and presenter)	Nov 2010
Faculty Development: Promotion Dossiers; Sullivan University College of Pharmacy. (attendee)	Oct 2010
Faculty Development: How to Not Get Sued; Sullivan University College of Pharmacy. (attendee)	Aug 2010
Faculty Retreat; Sullivan University (attendee and presenter)	Nov 2009
Faculty Development: How to Start a Clinical Practice Site; Sullivan University. (Co-leader)	May 2009
Faculty Development: Teaching Philosophies, Writing Objectives, Teaching Dos and Don'ts, and Writing Test Questions; Sullivan University. (Co-leader)	Dec 2008
Faculty Advance: Experiential Learning; Sullivan University (attendee)	Nov 2008
Faculty Development: Student Advising; Sullivan University College of Pharmacy (co-leader)	Jun 2008
Faculty Development: Basic Pedagogy and Assessment (Part II); Sullivan University (attendee)	Mar 2008
Faculty Development: Basic Pedagogy and Assessment (Part I); Sullivan University (attendee)	Feb 2008
Faculty Advance: Active Learning; Sullivan University (attendee) American Association of Colleges of Pharmacy Teaching Seminar (attendee)	Nov 2007
American Association of College of Pharmacy Teaching Seminar (attendee)	Jul 2007
American Association of College of Pharmacy Teaching Seminar (attendee)	Jul 2006
Teaching So Everyone Learns: Lilly North Conference on College Teaching (attendee)	Sept 2005

American Association of Colleges of Pharmacy Teaching Seminar (attendee)	Jul 2005
Holding a Cat by the Tail: Active Learning and Assessment in Pharmacy Practice: American College of Clinical Pharmacy (attendee)	Apr 2005
American Association of Colleges of Pharmacy Teaching Seminar (attendee)	Jul 2004
Education Scholar: Teaching Excellence and Scholarship Development Resources for Health Professions Educators Modules (6 modules)	Jun 2004
American Association of Colleges of Pharmacy Teaching Seminar (attendee)	Jul 2003
Introduction to Pharmaceutical Education Workshop (Coordinator/Moderator)	Jan 2003
Butler University College of Pharmacy and Health Sciences Primer in Pharmaceutical Education Workshop (attendee)	Aug 2002