Scott DM, Kelsch MP, Zhang A, Friesner DL. Appraisal of the entrustable professional activities interprofessional team member domain performed by North Dakota pharmacists. Pharmacy Practice 2021 Jan-Mar;19(1):2179.
https://doi.org/10.18549/PharmPract.2021.1.2179

Original Research

Appraisal of the entrustable professional activities interprofessional team member domain performed by North Dakota pharmacists

David M. SCOTT, Michael P. KELSCH, Anqing ZHANG, Daniel L. FRIESNER.
Received (first version): 8-Oct-2020 Accepted: 17-Jan-2020 Published online: 9-Feb-2021

Abstract

Objective: To quantify the use of the interprofessional team member (ITM) domain of entrustable professional activities (EPAs) by North Dakota pharmacists across practice sites, roles in practice, and by preceptor status.

Methods: Survey methods were used to characterize the self-reported frequency with which pharmacists undertake core EPAs and supporting tasks in the ITM domain. The survey was administered to registered pharmacists practicing in North Dakota (n=990) during the fall of 2018, of which 457 (46.1%) responded. After eliminating responses with incomplete or missing information, 119 responses were available for analysis.

Results: For the overall EPA ITM domain, "Collaborate as a member of an interprofessional team population" pharmacists reported performing these activities an average (mean) of 3.3 times per month (SD=2.3). Within this domain, the highest reported example activity was "Use setting appropriate communication skills when interacting with others" (mean=4.1, SD 1.8), followed by "Communicate a patient's medication-related problem(s) to another health professional" (mean=3.3, SD 2.0), and "Contribute medication-related expertise to the team's work" (mean=3.1, SD=2.2). ITM domain and supporting example activities were performed at a greater rate in hospitals, community health centers and long-term-care facilities. For most items, preceptors reported a greater use of activities, than did non-preceptors.

Conclusions: North Dakota pharmacists currently complete tasks outlined in the ITM domain of the EPAs, although their contributions are varied by task, role, and preceptor status.

Keywords

Education, Pharmacy; Schools, Pharmacy; Curriculum; Accreditation; Patient Care Team; Communication; Interprofessional Relations; Pharmacies; Patient Care; Pharmaceutical Services; Pharmacists; United States

INTRODUCTION

According to the Institute of Medicine (IOM), interdisciplinary teamwork is one of five core competencies for all healthcare professionals.[1] Within this interdisciplinary framework, all clinicians should: i) provide patient-centered care, ii) work as a member of an interprofessional team, iii) commit to an evidence-based approach to providing care; iv) apply quality improvement and control techniques to identify gaps in care; and v) use information technology to gather and communicate information to support points i) through iv).[1] While working as a member of an interprofessional team is listed as a unique, standalone competency, it is impossible to show mastery of the other four competencies without also displaying the attributes (communication, collaboration, embracing the unique expertise of other clinicians, shared decision making, etc.) that underlie the teamwork competency. In this sense, being a member of an interprofessional team can be interpreted as one of the most fundamental core competencies for clinical practice.

Effectively integrating interprofessional teamwork into the educational process occurs by introducing students to the principles and practice of teamwork early in their professional training. Thereafter, a variety of didactic and experiential learning opportunities are consistently embedded throughout the curriculum. Consistent reinforcement of interprofessional teamwork activities adds to the depth and breadth of the student's knowledge-skill set. Reinforcement also allows students to practice metacognition by reflecting on why these interprofessional teamwork competencies are vital to providing high quality, patient-centered care.[2,3] This process is so important that many health professions accrediting bodies (such as pharmacy, medicine, and nursing) require interprofessional education (IPE) as a specific standard or competency for their students' education.[3] As an example, the Accreditation Council for Pharmacy Education (ACPE) 2016 Standards designate IPE as its own standard (Standard 11).

This manuscript focuses on the use of Entrustable Professional Activities (EPAs) in pharmacy practice, which has embraced the use of this framework. The 2015-2016 American Association of Colleges of Pharmacy (AACP) Academic Affairs Committee created six Core EPA domains for pharmacy: interprofessional team member, patient care provider, practice manager, population health, information master, and self-developer.[4] The AACP Committee's

David M. SCOTT. BPharm, MPH, PhD. Department of Pharmacy Practice, School of Pharmacy, College of Health Professions, North Dakota State University. Fargo, ND (United States).
david.scott@ndsu.edu
Michael P. KELSCH. PharmD, BCPS. Department of Pharmacy Practice, School of Pharmacy, College of Health Professions, North Dakota State University. Fargo, ND (United States).
michael.kelsch@ndsu.edu
Anqing ZHANG. PhD. Children's National Medical Center, George Washington University, Washington DC (United States).
azhang2@childrensnational.org
Daniel L. FRIESNER. PhD. Department of Pharmacy Practice, School of Pharmacy, College of Health Professions, North Dakota State University. Fargo, ND (United States).
daniel.friesner@ndsu.edu

www.pharmacypractice.org (eISSN: 1886-3655 ISSN: 1885-642X)

expectation was that all new graduates should be able to perform all of these activities with limited direction from supervisors (Level 3 performance).[5] Pharmacy education is assessed according to the ACPE Standards and Center for the Advancement of Pharmacy Education (CAPE) Outcomes.[6,7] A contemporary crosswalk from ACPE Standards and CAPE Outcomes to EPAs has been developed to further display and explain these connections to pharmacy educators.[8,9] In doing so, EPAs facilitate valid and reliable assessments of students by preceptors during experiential curricula.[10,11]

Despite these advances, a paucity of literature in pharmacy education exists that assesses interprofessional focused activities in experiential settings.[1,2,12] In 1982, Scott and Hakanson reported on the evaluation of an interdisciplinary health training program at a community health center in south Minneapolis and found that students perceive that the interdisciplinary training increased their knowledge and positive attitudes towards interdisciplinary teams.[13] Since then, several other reports have been published.[14,15] In a 2011 survey of pharmacy schools, Jones and Blumenthal reported that IPE is occurring in 55% of the introductory pharmacy practice experiences (IPPEs). The most common activity was actual clinical experience with the health care team (80%), followed by interprofessional service learning (61%), shadowing other health care professionals (54%), and classroom case-based learning (34%).[16] In 2016 survey, Grice and Thomason reported a critical need to build competency-based interprofessional experiential education (IPPE, APPE), by collaborating with healthcare systems toward practice transformation.[17] Truong and Gorman described the lessons learned over a five-year period involving nine health disciplines of the Eastern Shore Collaborative for Interprofessional Education (ESCIPE), to prepare students through effective IPE curricular and co-curricular activities. Some of activities include emergency preparedness, patient management laboratory simulation, geriatric assessment interdisciplinary team workshop, medical mission as public/global health rotation, and a service-learning program. The authors indicate a need for formal evaluation of the program.[18]

The previous literature highlights an important gap in the pharmacy-based EPA and IPE literature.[14-16] Prior to further incorporating Core EPAs – including the interprofessional team member (ITM) domain - into pharmacy curricula and assessment practices, it is constructive to assess how frequently pharmacists perform specific Core EPAs in their daily pharmacy practice. As a corollary, it is useful to determine whether the frequency of use varies by practice setting, position, and preceptor status. Without this information, it is challenging to provide students with a set of experiential learning activities that emphasize ITM core activities and supporting tasks, especially if practicing clinicians do not routinely perform tasks in the ITM domain.

This exploratory analysis describes the frequency with which pharmacists practicing in the state of North Dakota report undertaking core EPAs and supporting tasks in the ITM domain. As a corollary, the self-reported frequency of undertaking core ITM EPAs and supporting tasks are disaggregated by preceptor status, position (pharmacy manager, staff pharmacist, clinical pharmacist, all other roles), and by practice setting (hospitals, independent community pharmacies, chain community pharmacies, and other practice settings).

METHODS

This descriptive pilot study is an extension of a series of manuscripts describing the self-reported frequency of EPA use in North Dakota.[19-21] A survey was designed to elicit information on EPA frequency of performance among pharmacists who practice in a rural state, whose population is less than 775,000 and more than half of its 53 counties recognized as "frontier counties".[22-24] At the time the survey was administered, only four communities in the state (Fargo/West Fargo, Bismarck, Grand Forks, and Minot) had populations in excess of 25,000 residents. For simplicity, and consistency with North Dakota's demographics, these four communities were designated as "urban" and all other communities were designated as "rural". Respondents were also asked to respond to a series of other demographic items, including their current practice setting (health-system pharmacy, chain community pharmacy, independent community pharmacy, or another setting), their current role in pharmacy practice (staff pharmacist, clinical pharmacist, pharmacy manager, or another position) their highest pharmacy-oriented degree, their age, their gender, and whether the respondent serves (or does not serve) as a preceptor for NDSU pharmacy students.

The survey itself was extensive, incorporating all six core EPA domains established by AACP, including the ITM domain, which is the subject of the current manuscript. We refer the reader to other published sources for a general overview of those aspects of the survey beyond demographics and the ITM domain.[21-23] The ITM domain was specifically defined using an overall EPA statement: "Collaborate as a member of an interprofessional team population", along with five supporting tasks that provide more specific examples relevant to the ITM domain. For each of these items, respondents were asked "How many times in the past 30 days have you delivered the following services in your practice setting?" Based on the authors' knowledge of the literature, and further refined by consultations with practicing and academic pharmacists, it was determined that a pharmacist who performed a task 5 or more times per month would undertake that task with regularity. Thus, response options for each task were based on a 6-point scale: 0, 1, 2, 3, 4, and 5 or more times.

The survey was designed using standard techniques.[1] The authors created an initial draft of the survey using their own training and experience. Once drafted, the survey was compared to others used in the literature and revised accordingly.[23] Next, the survey draft was pilot tested on five practicing pharmacists, and the feedback from these five pharmacists was used to further revise the survey. Once this work was completed, the study protocol and procedures (including the survey) were submitted to the NDSU Institutional Review Board, which approved the study.

The survey was administered using a modification of the Total Design Method - the gold standard in ensuring meaningful response rates for mail and internet-based surveys.[24-26] The population of interest was the collection

www.pharmacypractice.org (eISSN: 1886-3655 ISSN: 1885-642X)

of all pharmacists who are registered, and who currently practice, in North Dakota. The authors contacted the North Dakota Board of Pharmacy, who provided a list of names, email, and mailing addresses of all pharmacists who were licensed to practice in the state. Using this list, the investigators removed the names of pharmacists on the email list who reside well outside of the state's borders (and cannot commute to North Dakota to practice), the research team was left with a set of 990 possible study participants. More than half of North Dakota's population resides in the Red River Valley along the Minnesota-North Dakota border. The 990 names likely include pharmacists who are dually licensed in North Dakota and Minnesota, but who primarily practice in Minnesota. Thus, this number likely overstates the eligible study population by a considerable margin.

The survey was administered via the internet using the Qualtrics Survey Software (www.Qualtrics.com). In September 2018, each possible respondent received an email with an invitation to complete the survey. A link was included in the email with the internet address for the Qualtrics survey. Because internet-based surveys typically generate lower response rates than traditional (paper mail-based) surveys, multiple email reminders were sent to potential respondents.[26] General email reminders were sent during the 2nd, 4th, 6th, and 12th weeks after the initial invitation was distributed. Additional email reminders from the Senior Associate Dean and Dean of the School of Pharmacy were sent in weeks 8 and 10, respectively.

Data analysis

Responses were collected by the Qualtrics software and downloaded to a secured database. All data analyses were conducted using the SAS Version 9.4 Statistical Package.

Given the descriptive, exploratory nature of the analysis, the study operates under the general null hypothesis that no mean (or median) differences exist in the self-reported frequency of performing specific ITM tasks across different groups of pharmacists (i.e., age group, education level, practice setting, practice role, gender, preceptor status, or practice location). A critical methodological issue that exists in analyzing the survey responses is response truncation. As noted previously, each respondent is asked to self-report the frequency over a 30-day time-period with which they performed specific tasks in the ITM domain, using a 6-point response scale. If a pharmacist performs a given task infrequently (i.e., less than 5 times per month), they may choose the response option that exactly matches their self-reported frequency. In that case, the responses can be treated as an (approximately) ordinal variable. Concomitantly, all responses above 4 (i.e., 5 or more) are clustered into a single response, which leads to truncation at the right-hand side of the response scale and precludes analyzing the data as an approximately ordinal variable. The data analysis operates under the assumption that the response scale was designed consistently with the EPA literature and contemporary pharmacy practice in North Dakota, in which case it appropriately captures the frequency (and variation in the frequency) of activities undertaken in the ITM domain. As a result, truncation is not of substantial concern, and the data can be summarized using means and standard deviations for each EPA task in the ITM domain. Further, the Kruskal-Wallis test – a nonparametric analog of analysis of variance - can be used to assess the null hypothesis of no mean/median differences across different respondent groups.[27] All hypothesis tests utilize a 5 percent significance level.

RESULTS

Of the 990 pharmacists who were invited to participate in the survey, 457 responded. Examining the 457 responses, it was determined that only 355 individuals actively practiced pharmacy in North Dakota and met the study's inclusion criteria. Of these 102 non-eligible study participants, 33 were not employed as pharmacists within North Dakota, 28 were retired, 27 were not employed in a patient care setting (i.e., they were employed in the pharmaceutical industry, at insurance companies, etc.), 7 were unemployed, and 7 were not practicing in a pharmacy-related career. These statistics highlight the fluid nature of the labor market for pharmacists in North Dakota. Because the survey asks respondents to report the frequency of EPA use across all major EPAs and supporting tasks, the survey is lengthy. As a result, not all respondents answered every survey item. Moreover, some respondents failed to address a small number of items, while other failed to complete large portions of the survey. Because the authors did not feel comfortable making decisions about which of these partial responders should be included or excluded from the data analysis, a conservative decision was made to exclude any respondent that did not provide a complete set of responses to the ITM and supporting task items, as well as the study's demographic items (which were placed at the end of the survey). This left the researchers with a working sample of 119 observations and a 12% response rate.

Table 1. Mean and proportion of the interprofessional team member domain with each demographic characteristic (n=119)

Gender; (proportion)	
Female	0.7
Male	0.3
Age in years; Mean (SD)	43.2 (11.5)
Age group; (proportion)	
Under 40 years of age	0.5
40-49 years of age	0.2
50-59 years of age	0.2
60 years of age or older	0.1
Highest pharmacy-related degree; (proportion)	
Bachelor's degree	0.3
Doctor of Pharmacy	0.5
Post-graduate residency	0.1
Other degree	0.1
Practice setting; (proportion)	
Hospital	0.3
Independent community	0.4
Chain community	0.1
All other settings	0.2
Respondent's role; (proportion)	
Pharmacy manager	0.4
Staff pharmacist	0.3
Clinical pharmacist	0.2
All other roles	0.1
Population of community served; (proportion)	
Under 5,000	0.2
5,000-24,999	0.2
25,000 or more	0.6
NDSU pharmacy preceptor; (proportion)	
Yes	0.5

Table 2. Mean and proportion of entrustable professional activities by interprofessional team member domain (n=119)	
Interprofessional team member EPA description	**Mean (SD)**
1. Collaborate as a member of an interprofessional team population.	3.3 (2.3)
a. Contribute medication-related expertise to the team's work	3.1 (2.2)
b. Explain to a patient, caregiver, or professional colleague each team member's role and responsibilities.	1.4 (2.0)
c. Communicate a patient's medication-related problem(s) to another health professional.	3.3 (2.0)
d. Use setting appropriate communication skills when interacting with others	4.1 (1.8)
e. Use consensus building strategies to develop a shared plan of action.	1.9 (2.2)

A summary of respondent demographics can be found in Table 1. The mean age of respondents was 43.2 years, and 70% of respondents were female. Approximately 50% of respondents held the Doctor of Pharmacy as their highest degree, with approximately 30% of respondents holding a bachelor's degree in pharmacy as their highest degree. Only 10% of respondents had completed a post-graduate residency. Respondents practiced in a variety of different settings, with 40% practicing in independent community pharmacy, 10% in chain community pharmacy, 30% in health system pharmacy, and 20% in other practice areas. Regarding respondents' roles in the pharmacy, approximately 40% held a pharmacy manager position, 30% a staff pharmacist position, 20% a clinical pharmacist position, and 10% held another type of role. Regarding the type of community served, approximately 60% of respondents worked in an "urban" community of 25,000 or more residents, while the remaining 40% worked in "rural" communities. Of these rural communities, 20% reported working in a community with fewer than 5,000 residents. Lastly, half of respondents reported that the serve as a preceptor for the state's lone pharmacy program.

Descriptive statistics for the EPA ITM domain can be found in Table 2. The first EPA ITM "Collaborate as a member of an interprofessional team population," was performed an average of 3.3 times per month (SD=2.3). Within this professional activity, the most commonly occurring EPA supporting task was "Use setting appropriate communication skills when interacting with others," performed an average of 4.1 times per month (SD=1.8), followed by "Communicate a patient's medication-related problem(s) to another health professional" (mean 3.3, SD=1.8), and "Contribute medication-related expertise to the team's work" (mean 3.1, SD=2.2).

Table 3 disaggregates the self-reported frequency of undertaking ITM tasks by the pharmacists practice setting. The Kruskal-Wallis test indicates that significant differences exist across practice setting for the ITM core EPA (p<0.01). The core EPA "Collaborate as a member of an interprofessional team population" was undertaken most frequently by pharmacists who work in hospitals/health systems, followed by other pharmacy practice settings (i.e., community health centers and long-term-care facilities), then community independents, and chain pharmacies. Statistically significant differences were noted among practice settings for many supporting tasks including "Use setting appropriate communication skills when interacting with others" (p=0.01), "Contribute medication-related expertise to the team's work" (p<0.01), "Communicate a patient's medication-related problem(s) to another health professional" (p=0.01), "Use setting appropriate communication skills when interacting with others" (p=0.01), and "Use consensus building strategies to develop a shared plan of action" (p<0.01). For each of these ITM EPA supporting tasks, the highest means were reported by hospital/health system pharmacists, and lowest means were reported by chain and independent community pharmacists.

Table 4 disaggregates results according to the pharmacist's position. The Kruskal-Wallis test indicates that significant differences exist in the self-reported frequency of the core ITM activity "Collaborate as a member of an interprofessional team population" (p=0.01). Clinical pharmacists reported undertaking this general activity much more frequently than other pharmacists. Within the supporting ITM EPA tasks, statistically significant differences across pharmacists were reported for the items: "Contribute medication-related expertise to the team's work errors" (p=0.01), "Explain to a patient, caregiver, or professional colleague each team member's role and responsibilities" (p=0.01), "Communicate a patient's medication-related problem(s) to another health professional" (p=0.01), and "Use consensus building strategies to develop a shared plan of action" (p=0.01). Clinical pharmacists generally reported higher frequencies of undertaking supporting ITM EPAs than did the staff pharmacists and pharmacy managers.

Lastly, Table 5 disaggregates the ITM domain and core supporting EPAs by preceptor status (i.e., served as a

Table 3. Entrustable practice activities (EPA) of interprofessional team member domain by practice setting (n = 119)					
EPA description; mean (SD)	**Hospital [n = 33]**	**Independent community [n = 45]**	**Chain community [n = 14]**	**All other practices [n = 27]**	**p-value***
1. Collaborate as a member of an interprofessional team population.	4.7 (1.0)	2.1 (2.3)	2.0 (2.2)	4.1 (1.9)	<0.01
a. Contribute medication-related expertise to the team's work	4.6 (1.1)	1.9 (2.2)	1.6 (1.7)	3.9 (1.9)	<0.01
b. Explain to a patient, caregiver, or professional colleague each team member's role and responsibilities.	1.9 (2.2)	0.8 (1.6)	1.9 (2.3)	1.7 (1.9)	0.01
c. Communicate a patient's medication-related problem(s) to another health professional.	4.2 (1.4)	2.4 (2.2)	2.9 (2.0)	4.0 (1.8)	0.01
d. Use setting appropriate communication skills when interacting with others	4.9 (0.5)	3.4 (2.2)	2.9 (1.5)	4.3 (1.7)	0.01
e. Use consensus building strategies to develop a shared plan of action.	3.4 (2.1)	0.7 (1.4)	1.4 (2.0)	4.2 (2.4)	<0.01
* Kruskal-Wallis Test					

Table 4. Entrustable professional activity (EPA) of interprofessional team member by position (n = 119)

EPA description; mean (SD)	Manager [n = 44]	Staff pharmacist [n = 37]	Clinical pharmacist [n = 28]	All other positions [n = 10]	p-value*
1. Collaborate as a member of an interprofessional team population.	2.8 (2.3)	2.9 (2.3)	4.6 (1.2)	3.0 (2.6)	0.01
a. Contribute medication-related expertise to the team's work	2.5 (2.2)	2.7 (2.2)	4.5 (1.4)	2.7 (2.5)	0.01
b. Explain to a patient, caregiver, or professional colleague each team member's role and responsibilities.	1.6 (2.0)	0.7 (1.5)	2.6 (2.3)	0.4 (1.0)	0.01
c. Communicate a patient's medication-related problem(s) to another health professional.	3.0 (2.1)	2.9 (2.0)	4.5 (1.4)	3.1 (2.2)	0.01
d. Use setting appropriate communication skills when interacting with others	3.9 (2.0)	3.7 (2.1)	4.7 (1.1)	4.8 (0.6)	0.13
e. Use consensus building strategies to develop a shared plan of action.	2.1 (2.2)	1.0 (1.8)	2.9 (2.3)	1.3 (2.2)	0.01

* Kruskal-Wallis Test

preceptor for the state's lone pharmacy program during the past year). The core EPA ITM domain "Collaborate as a member of an interprofessional team population" was statistically significant using the Kruskal-Wallis test (p=0.04). For this EPA, preceptors reported higher activity levels when compared to non-preceptors. Within the supporting tasks, the items "Contribute medication-related expertise to the team's work," (p=0.03), "Explain to a patient, caregiver, or professional colleague each team member's role and responsibilities" (p=0.03), "Communicate a patient's medication-related problem(s) to another health professional" (p=0.03), "Use setting appropriate communication skills when interacting with others" (p=0.01), and "Use consensus building strategies to develop a shared plan of action" (p=0.01), were undertaken more frequently by preceptors than non-preceptors.

DISCUSSION

The primary value of Core EPAs and supporting tasks in clinical education is to create a shared language linking academic outcomes to professional competencies.[4,11] With the inclusion of a reliable and valid rating scale, Core EPAs such as ITM and supporting tasks may also serve as a measure of student performance. This shared language is especially important for IPE, as it is largely experiential in nature. However, there is currently a lack of evidence that establishes the reliability and validity of the Core EPAs of a pharmacist in diverse practice settings.[19-21] This study's objective was to assess the frequency of performing Core EPAs as reported by pharmacists practicing in North Dakota. Frequency of performed EPAs contributes to the overall validity of using these activities to assess outcomes in pharmacy education and practice. This manuscript focuses on reporting EPAs and example supporting tasks in the ITM domain. For information on other domains, the reader is referred to manuscripts that describe the Core EPAs in the practice management domain, the patient care domain, and the population health domain.[19-21]

For the EPA ITM domain, North Dakota pharmacists reported performing "Collaborate as a member of an interprofessional team population" (mean=3.3, SD=2.3) on a regular basis. Supportive activities of this domain that were highly rated (means of 3.1 or higher) were: "Use setting appropriate communication skills when interacting with others," "Communicate a patient's medication-related problem(s) to another health professional, and "Contribute medication-related expertise to the team's work." The remaining ITM EPA supporting tasks were not performed as frequently.

These findings were not entirely surprising. Pharmacists in North Dakota currently perform some ITM activities, but not at a consistent and high level. The relatively low level of team member involvement is likely attributed to most activities were dispensing-related and oriented towards individual patients (micro-level). Perhaps it is because most of the study participants worked in pharmacy settings that were community (independent and chain) in nature, or worked in pharmacy positions that were non-clinical in designation where the primary activity is medication-related (e.g., prescription preparation and patient counseling) rather than interprofessional team member activities. Another possible contributing factor is that North Dakota has a unique state law requiring each community pharmacy to have a North Dakota-licensed pharmacist owning 51% or more of the pharmacy, thereby restricting the number of chain stores.[22] As a common result of this unique law, the independent community pharmacy is typically managed by the pharmacy owner who also serves as the primary pharmacist. This dual role often does not provide the pharmacist additional time for expanded practice opportunities including those within the ITM domain. Clinical pharmacists reported performing most of the tasks at a higher level than did the pharmacy managers, independent and chain community pharmacists. This finding is predictable given the common job descriptions of clinical pharmacists often working in direct collaboration with providers or nurses.

Table 5. Interprofessional team member entrustable professional activities (EPAs) by preceptor status (n = 119)

EPA Description; mean (SD)	Precept NDSU students		p-value*
	No [n=62]	Yes [n=57]	
1. Collaborate as a member of an interprofessional team population.	2.9 (2.4)	3.7 (2.1)	0.04
a. Contribute medication-related expertise to the team's work	2.7 (2.2)	3.5 (2.1)	0.03
b. Explain to a patient, caregiver, or professional colleague each team member's role and responsibilities.	1.0 (1.7)	1.9 (2.2)	0.03
c. Communicate a patient's medication-related problem(s) to another health professional.	2.9 (2.1)	3.7 (1.9)	0.03
d. Use setting appropriate communication skills when interacting with others	3.7 (1.2)	4.5 (1.5)	0.01
e. Use consensus building strategies to develop a shared plan of action.	1.2 (1.9)	2.6 (2.3)	0.01

* Kruskal-Wallis

www.pharmacypractice.org (eISSN: 1886-3655 ISSN: 1885-642X)

In our study, the ITM EPAs were also reported by preceptor status (NDSU preceptor and non-preceptor). Preceptors were defined as those reporting they were a NDSU preceptor in the past year. In the core EPA ITM "Collaborate as a member of an interprofessional team population," and three of five supportive tasks: "Use setting appropriate communication skills when interacting with others," "Communicate a patient's medication-related problem(s) to another health professional," and "Contribute medication-related expertise to the team's work," were statistically significant. For the core EPA ITM and its supportive activities, the NDSU School of Pharmacy preceptors performed those tasks more frequently than did non-NDSU preceptors. Whether pharmacy preceptors actively seek opportunities to practice interprofessionally, work in settings that require interprofessional practice, are simply more cognizant of the interprofessional aspects of their work, or some combination of these forces, is beyond the scope of this manuscript. With that said, the results of our manuscript do suggest that preceptors are positioned to actively involve students in tasks that fall within the ITM domain. Additionally, when recruiting new preceptors, it may be advisable to assess the extent to which potential preceptors can involve students in interprofessional activities to ensure that students routinely undertake ITM EPA and supporting tasks.

There is a shortage of assessment data of the Core EPAs in the daily pharmacist practice in various practice settings. Pharmacists in hospitals and in all other settings (e.g., community health centers, long-term-care facilities) generally performed most of the core EPA ITM domain items and their supportive example tasks more frequently, than did chain and independent community pharmacists. Perhaps pharmacists in hospitals and all other settings may have more opportunities (since they work in practice settings with other health care professionals) for direct interprofessional team member domain activities versus more traditional dispensing roles in chain and independent community pharmacies.

Limitations

This study has several limitations, all of which have been previously identified in the literature.[19-21] The study's data are drawn from a single, very rural state with a unique pharmacist labor market and regulatory structure that encourages independent community pharmacy ownership. Moreover, responses were collected during the end of 2018 and the start of 2019. These unique characteristics may limit the external validity and generalizability of the study's results.

A second limitation concerns the attributes of the survey used to elicit pharmacist responses. The list of EPAs and supporting tasks are drawn from the 2015-2016 AACP EPAs list.[4,5] Changes in pharmacy practice or other common collaborating health professions (e.g., medicine, nursing) over time may necessitate revision or expansion of the EPAs list, especially in the ITM domain. As this evolution occurs, the information provided in this study may become obsolete. Additionally, the survey asks respondents to rate the frequency (over a 30-day window) with which they report undertaking these tasks using a 6-point response scale. If pharmacists undertake one or more of these tasks daily, results will be truncated at the end of the scale. This type of truncation limits the quantity and quality of information that can be gleaned from the survey and may limit the ability of means and standard deviations to comprehensively summarize the data. Truncation also limits the ability of the Kruskal-Wallis test to appropriately assess the statistical significance of mean differences across groups of respondents. Overall, replications of this study that improve upon our survey's design would add a meaningful extension of our work.

The response rate for the study represents a third limitation. While 990 individuals received an invitation to complete the survey, only 119 (12%) provided a complete set of responses for the ITM EPA domain and supporting tasks, as well as demographics. Therefore, the response rate for the sample is low. Perhaps more concerning is the number of respondents who started the survey but failed to complete it. Replications of the current study that focus on a single Core EPA, would likely reduce the length of the survey. This, in turn, would reduce the number of individuals who start the survey, but fail to complete it. In doing so, the response rate for that study would be improved.

A final limitation is that EPAs require a set of core competencies that are measurable units in the workplace. Several EPAs and supportive examples were not highly, or consistently, reported by the North Dakota pharmacists. These findings suggest that the AACP core EPA list may require refinement based upon pharmacy practice setting. For example, in this study, the EPAs ITM domain was most performed by pharmacists in hospitals, community health centers, and long-term care facilities. It should also be noted that the core EPA list were not intended to be assessed in all practice settings, they were intended to guide what a generalist pharmacist should look like upon graduation. For instance, some core EPAs may only be practiced and assessed at one practice site. Further research by practice setting is necessary to further examine these issues.

CONCLUSIONS

North Dakota pharmacists currently complete tasks outlined in the interprofessional team member domain of the entrustable professional activities. However, the frequency with which they report undertaking these tasks vary considerably by the task being evaluated, the pharmacist's role, and preceptor status, among other factors. This study provides evidence suggesting that the EPAs ITM domain has potential to assess outcomes in pharmacy education and practice.

ACKNOWLEDGMENTS

The authors acknowledge the North Dakota Pharmacists who participated in this survey. Melissa Eslinger, who setup and administered the survey in Qualtrics.

CONFLICT OF INTEREST

The authors report no conflict of interest in the conduction of this study or the preparation of this manuscript.

FUNDING

None.

AUTHOR ROLES (CRediT)

Conceptualization: DMS, DLF.
Data curation: DMS, AZ, DLF.
Formal analysis: AZ, DLF.
Investigation: DMS.
Methodology: DMS, DLF.
Supervision: DMS.
Validation: MPK, DLF.
Writing – original draft: DMS, MPK, DLF.
Writing – review & editing: DMS, MPK, DLF.

References

1. Greiner AC, Knebel E, eds. Health Professions Education: A Bridge to Quality. Washington: National Academies Press; 2003.
2. Hopkins D, ed. Framework for Action on Interprofessional Education and Collaborative Practice. Geneva: WHO; 2010.
3. Interprofessional Education Collaborative. Core competencies for interprofessional collaborative practice: Report of an expert panel. Washington: Interprofessional Education Collaborative; 2016.
4. Haines ST, Gleason BL, Kantorovich A, et al. Report of the 2015-2016 Academic Affairs Standing Committee. Am J Pharm Educ. 2016;80(9):S20. https://doi.org/10.5688/ajpe809s20
5. Haines ST, Pittenger A, Plaza C. Describing Entrustable Professional Activities Is Merely the First Step. Am J Pharm Educ. 2017;81(1):18. https://doi.org/10.5688/ajpe81118
6. Accreditation Council for Pharmacy Education (ACPE). Accreditation standards and key elements for the professional program in pharmacy leading to the Doctor of Pharmacy degree. https://www.acpe-accredit.org/pdf/Standards2016FINAL.pdf (accessed Oct 8, 2020).
7. Medina MS, Plaza CM, Stowe CD, et al. Center for the Advancement of Pharmacy Education 2013 educational outcomes. Am J Pharm Educ. 2013;77(8):162. https://doi.org/10.5688/ajpe778162
8. Kanmaz TJ, Culhane NS, Berenbrok LA, Jarrett J, Johanson EL, Ruehter VL, Trolli E, Welch LH and Heldenbrand SD. Curriculum crosswalk of the core entrustable professional activities for new pharmacy graduates. Am J Pharm Educ. 2020;84(1):8077. https://doi.org/10.5688/ajpe8077
9. Smith C, Stewart R, Smith G, Anderson HG, Baggarly S. Developing and implementing an entrustable professional activity assessment for pharmacy practice experiences. Am J Pharm Educ. 2020;84(9):ajpe7876. https://doi.org/10.5688/ajpe7876
10. Hauer KE, Kohlwes J, Cornett P, et al. Identifying entrustable professional activities in internal medicine training. J Grad Med Educ. 2013;5(1):54-59. https://doi.org/10.4300/jgme-d-12-00060.1
11. Pittenger AL, Copeland DA, Lacroix MM, et al. Report of the 2016-17 Academic Affairs Standing Committee: Entrustable professional activities implementation roadmap. Am J Pharm Educ. 2017;81(5):S4. https://doi.org/10.5688/ajpe815s4
12. Greiner AC, Knebel E, eds. Health professions education: a bridge to quality. Washington: National Academies Press; 2003.
13. Scott DM, Montagne M, Hakanson N, Schwanke RW. The development and evaluation of an interdisciplinary health training program: a pharmacy perspective. Am J Pharm Educ. 1983;47(1):42-48.
14. Gustafsson L, Hutchinson L, Theodoros D, et al. Healthcare students' experiences of an interprofessional, student-led neuro-rehabilitation community-based clinic. J Interprof Care. 2016;30(2):259-261. https://doi.org/10.3109/13561820.2015.1086730
15. Rotz ME, Dueñas GG. "Collaborative-ready" students: Exploring factors that influence collaboration during a longitudinal interprofessional education practice experience. J Interprof Care. 2016;30(2):238-241. https://doi.org/10.3109/13561820.2015.1086731
16. Jones KM, Blumenthal DK, Burke JM, et al. Interprofessional education in introductory pharmacy practice experiences at US colleges and schools of pharmacy. Am J Pharm Educ. 2012;76(5):80. https://doi.org/10.5688/ajpe76580
17. Grice GR, Thomason AR, Meny LM, Pinelli NR, Martello JL, Zorek JA. Intentional Interprofessional Experiential Education. Am J Pharm Educ. 2018;82(3):6502. https://doi.org/10.5688/ajpe6502
18. Truong HA, Gorman MJ, East M, et al. The Eastern Shore Collaborative for Interprofessional Education's Implementation and Impact over Five Years. Am J Pharm Educ. 2018;82(4):6522. https://doi.org/10.5688/ajpe6522
19. Scott DM, Naughton CA, Petry N, Friesner DL. Assessment of Practice Management Entrustable Professional Activities by Pharmacists in North Dakota. Am J Pharm Educ. 2019;83(10):7486. https://doi.org/10.5688/ajpe7486
20. Scott DM, Kelsch MP, Hanel M, Friesner DL. Appraisal of the entrustable professional activities (EPAs) patient care provider domain by North Dakota pharmacists. Pharm Pract (Granada). 2019;17(4):1607. https://doi.org/10.18549/pharmpract.2019.4.1607
21. Scott DM, Kelsch M, Zhang A, Friesner DL. Evaluation of the entrustable professional activities (EPAs) of the population health promoter domain by North Dakota pharmacists. Pharm Pract (Granada). 2020;18(3):1980. https://doi.org/10.18549/pharmpract.2020.3.1980
22. Scott DM. Assessment of pharmacists' perception of patient care competence and need for training in rural and urban areas in North Dakota. J Rural Health. 2010;26(1):90-96. https://doi.org/10.1111/j.1748-0361.2009.00270.x
23. Draugalis JR, Coons SJ, Plaza CM. Best practices for survey research reports: a synopsis for authors and reviewers. Am J Pharm Educ. 2008;72(1):11. https://doi.org/10.5688/aj720111
24. Scott DM, Strand M, Undem T, Anderson G, Clarens A, Liu X. Assessment of pharmacists' delivery of public health services in rural and urban areas in Iowa and North Dakota. Pharm Pract (Granada). 2016;14(4):836. https://doi.org/10.18549/pharmpract.2016.04.836

www.pharmacypractice.org (eISSN: 1886-3655 ISSN: 1885-642X)

25. Dillman D, Smyth J, Christian L. Internet, mail, and mixed mode surveys: the tailored design method, 3rd ed. Hoboken: John Wiley; 2009.
26. Nulty D. Adequacy of response rates to online and paper surveys: What can be done? Assess Eval High Educ. 2008;33(3):301-314. https://doi.org/10.1080/02602930701293231
27. Slack MK, Baidoo B. Chapter 10: Bivariate analysis and comparing groups. In: Aparasu R, Bentley J, eds. Principles of research design and drug literature evaluation. Burlington: Jones and Bartlett; 2015.

www.pharmacypractice.org (eISSN: 1886-3655 ISSN: 1885-642X)