

Development of the Department of Veterans Affairs Centers of Excellence in Primary Care Education Trainee Participant Survey: Measuring Trainees' Perceptions of an Interprofessional Education Curriculum

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ABSTRACT

Background: The Trainee Participant Survey was developed for the evaluation of the Department of Veterans Affairs, Centers of Excellence in Primary Care Education (VA CoEPCE), which developed and delivered an interprofessional education (IPE) postgraduate curriculum to learners of multiple professions at seven geographically diverse VA facilities across the United States.

Methods and findings: Perceptions of the curriculum by learners across professions were assessed to identify differences in curricular perceptions and unmet needs to inform programmatic changes. The comparison of responses by profession revealed no statistically significant differences across the core domains; precepting, supervising, mentoring; or program practices. Trainee professions differed significantly on satisfaction and system impacts.

Conclusion: The Trainee Participant Survey has excellent psychometric properties and can serve as a model for evaluating future IPE programs.

Keywords: Interprofessional education; Trainees; Team-based; Health professions; Program evaluation

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Introduction

Over forty years ago, the Institute of Medicine [1] and the World Health Organization [2] began promoting interprofessional education (IPE) as a means to better address patient and community needs in complex healthcare systems. Data from the increasing number of IPE programs worldwide demonstrates that IPE fosters collaborative practice that leads to improvements in health outcomes within

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healthcare systems [2,3]. However, changes in behavior and practice must be preceded by changes in learners' perceptions of IPE [4]. While several profession-specific programs have reported on measures of IPE attitudes and outcomes, few tools have been validated [5-8]. Furthermore, significant differences in educational strategies, participants, patient populations, and other contextual factors limit the use of these tools across sites and healthcare settings [9]. The U.S. Department of Veterans Affairs, Veterans Health Administration (VA) Centers of Excellence in Primary Care Education (VA CoEPCE) provide an ideal setting to create, validate, and subsequently administer a tool to measure perceptions of the IPE curriculum across seven geographically diverse primary care sites as part of an innovative post-graduate program.

The VA Office of Academic Affiliations (OAA) launched the VA CoEPCE in 2011 with the aim of fostering the transformation of clinical education by preparing graduates of health professional programs to work in, lead, and improve patient-centered, interprofessional, primary care teams that provide coordinated longitudinal care [10]. The VA CoEPCE program developed and delivered interprofessional curricula for learners across multiple professions, including nurse practitioner residents, nursing students, physician residents, psychology fellows, and pharmacy residents. Registered nurses, social workers, and physical therapists were eligible to participate, although few trainees from these professions enrolled in the program. Previous studies have reported that students have asked for more interaction with other health professions as part of their training to gain knowledge about the roles and responsibilities of other professions [11].

Each of the seven VA CoEPCE sites across the VA system was charged with developing and implementing unique local interprofessional curricula that were aligned with national VA CoEPCE program goals. The sites worked both individually and collectively to develop their local curricula based on the model shown in Figure 1. In this model, the instructional strategies (didactics, workplace learning, and reflective practice) [12] were used to focus teaching activities on four core domains: interprofessional collaboration, sustained relationships, shared decision-making, and performance improvement. These domains are consistent with other IPE programs [13]. Interprofessional collaboration involves trustful, collaborative relationships for delivering team-based, coordinated care; sustained relationships among trainees with patients, providers, and staff by facilitating care that is patient-centered, continuous, comprehensive, and coordinated; shared decision-making that focuses on the communication skills necessary to promote a patient's self-efficacy to manage their own health through care delivery that is aligned with their values, preferences, and cultural perspectives; and performance-improvement efforts that focus on using the methodology of continuous improvement in redesigning care to achieve quality outcomes to optimize the health of populations. Several previous studies have been published describing the VA CoEPCE educational domains and delivery of curricula [10,14,15].

Standardized instructional strategies (didactics, workplace learning, and reflective practice) were developed to teach these four educational domains based on tar-

geted learning objectives for trainees. Unlike specialized IPE programs, the VA CoEPCE IPE program simultaneously delivered a standardized IPE postgraduate curriculum in addition to unique local curricula to learners from multiple disciplines at each site. The curriculum was delivered in the primary care clinic setting to allow trainees from different professions to practice IPE skills in real time with learners from other professions with feedback from IPE faculty. The overall VA CoEPCE interprofessional curriculum was designed to address the needs of all professions, yet it also recognized the importance of profession-specific elements. While all trainees participated in common program components for achieving competency in the four primary educational domains, profession-specific training experiences were offered based on trainee needs, professional accreditation requirements, and the duration of training.



Figure 1. Centers of Excellence in Primary Care Education: Four core curricular domains and clinical instruction

The Trainee Participant Survey was developed to assess perceptions of the standardized IPE curriculum by learners from multiple professions to identify areas where the curriculum could be enhanced. The goal of the survey was to detect differences in curricular perceptions and identify unmet needs by profession in order to make programmatic changes to meet the needs of all learners. No tools have been previously developed to evaluate a standardized curriculum to compare perceptions across multiple professions. This article addresses the question of

whether the Trainee Participant Survey is a valid instrument for measuring the key curricular domains of the VA CoEPCE program across trainee disciplines. This question was addressed by the following two aims: 1) to develop and test the psychometric properties of a trainee survey to assess perceptions about the delivery of the four core curricular domains (interprofessional collaboration, shared decision-making, sustained relationships, and performance improvement), as well as other key VA CoEPCE program elements, including precepting/mentoring, system impacts, program practices, and trainee satisfaction for program evaluation purposes; and 2) to present trainee responses from the 2017 survey for the core domains and key program elements.

Methods

This analysis was categorized as program evaluation according to the Veterans Health Administration Program Guide 1200.21 and determined to be exempt from the Institutional Review Board oversight.

Development of the Trainee Participant Survey

The survey was developed by an interprofessional evaluation team comprised of VA CoEPCE evaluators and an external VA research group. This tool was developed for program evaluation rather than individual trainee assessment to identify differences in curricular perceptions and unmet needs by profession in order to make programmatic changes to meet the needs of all learners. The team of experts that developed this survey included two physician educators (SR, SG), two psychometricians (SS, AA), one nurse practitioner (KR), three program evaluation experts (JD, NH, AP), and one statistician (RT). As the first step in this process, competency items from the Interprofessional Education Collaborative (IPEC) were reviewed and content relevant to the VA CoEPCE program evaluation was identified [16]. These items were reviewed, and input from a team of experts was used to modify this content for VA CoEPCE program evaluation purposes. Additional items were developed to measure other key program elements, including satisfaction with each of the four core educational domains; satisfaction with CoEPCE program components; precepting, supervising, and mentoring by VA CoEPCE faculty; system impacts; and program practices. A list of 176 items representing 20 domains was drafted. To reduce the number of items, a preliminary exploratory factor analysis (data not shown) guided by the program conceptual model was conducted. Then, an expert panel and key stakeholders identified the final eight domain subscales, including four core program domains and four program key elements, that were most relevant to this program. The instrument went through further pilot testing and item modification. Face validity and content validity were also assessed for each domain by study investigators (JAD, SS, NDH). Face validity refers to whether the survey items in that domain appear to be measuring the curricular domain of interest, and content validity refers to a judgment about whether survey items adequately cover the domain of interest [17,18]. The final survey instrument included a total of 24 questions, with some questions containing multiple items.

Data collection procedures

The survey was administered to current trainees from the seven VA CoEPCE sites (Boise, ID; Cleveland, OH; Greater Los Angeles, CA; Houston, TX; San Francisco, CA; Seattle, WA; and West Haven, CT) from February 2017 through April 2017. The survey was administered using SurveyMonkey. Invitations to participate were emailed to trainees from the national VA CoEPCE Coordinating Center and included a direct link to the survey. In addition, VA CoEPCE site directors sent personalized, follow-up emails requesting trainees to complete the survey. Responses were monitored and email reminders were sent approximately every two weeks to those trainees who had not responded. The survey response rate at the end of eight weeks was 58 percent across all sites. Individual site response rates ranged from 42 percent to 89 percent.

Trainee survey instrument

The final survey instrument included a total of 24 questions, with four core program domains and four key program elements (see Appendix). The subscales used to measure the four core program domains and four key program elements are described below.

Core CoEPCE program domain subscales

Interprofessional collaboration was defined as experience working with multidisciplinary faculty and trainees to deliver team-based, coordinated care. This domain was measured by the frequency with which trainees practiced skills on providing clinical care and interprofessional communication during their VA CoEPCE training. It was based on a 4-item, 5-point Likert scale ranging from 1 (*never*) to 5 (*always*).

Shared decision-making was defined as effectively partnering with patients and caregivers to facilitate patient-centered treatment decisions. This domain was measured by the frequency with which trainees practiced shared decision-making skills, including partnering with patients, motivational interviewing, and using telemedicine as appropriate when interacting with patients and their caregivers. It was based on a 5-item, 5-point Likert scale ranging from 1 (*never*) to 5 (*always*).

Sustained relationships was defined as learning to develop relationships with patients and other providers built on a foundation of mutual respect and trust to facilitate care delivery. This domain was measured by the frequency with which trainees practiced skills that help develop relationships with patients, providers, and staff as well as manage differences in opinion. It was based on a 4-item, 5-point Likert scale ranging from 1 (*never*) to 5 (*always*).

Performance improvement was defined as applying systematic approaches to identify gaps in care delivery and improve quality. This domain was measured by the frequency with which skills related to improving performance were practiced. It was based on a 4-item, 5-point Likert scale ranging from 1 (*never*) to 5 (*always*).

Key CoEPCE program elements subscales

Overall trainee satisfaction with the VA CoEPCE program was defined as overall satisfaction with their training experience in the VA CoEPCE program. It was measured using a 12-item, 6-point Likert scale, with anchors from 1 (*highly dissatisfied*) to 5 (*highly satisfied*), with 0 (*did not experience*).

Precepting, supervising, and mentoring were measured by examining the availability, receipt, and effectiveness of each of these key program elements. Precepting occurred in the primary care clinical setting and was defined as the availability of faculty to answer clinical questions in real time. Supervising also occurred in the primary care clinical setting and was defined as having VA CoEPCE clinical faculty present to oversee the quality of clinical care being delivered by trainees. Mentoring typically occurred outside of the clinical setting and was defined as providing career guidance and role modeling to facilitate professional success. These were measured using a 6-item, 6-point Likert scale ranging from 1 (*very ineffective*) to 5 (*highly effective*), with 0 (*did not experience*).

System impacts were defined as the impact of the VA CoEPCE program on the healthcare system. This included making a contribution to best practices in primary

care, feeling valued by leadership, and determining whether relationships were fostered with academic affiliates. This domain was measured with sample data about respondents' agreement with statements about the VA CoEPCE program. It consisted of a 9-item, 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Program practices were defined as how trainees experienced the program during their fellowship, including understanding expectations and receiving clear feedback, access to opportunities, and guidance in how to achieve their goals. This domain consisted of a 7-item, 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Data analysis

Data were analyzed using SAS[®] 9.4 (SAS Institute, Inc., Cary, North Carolina). To assess the psychometric properties of the survey, an exploratory factor analysis was used to evaluate the factor structure for all eight survey measures. The two program elements subscales for overall trainee satisfaction and precepting, supervising, mentoring was evaluated. The response "did not experience" was set to missing. The Kaiser criterion (eigenvalues > 1) and parallel analysis were used to determine retaining factors [19]. The internal consistency reliability of the resulting factors was examined by calculating Cronbach's alpha for each factor. Items within a factor were then averaged to calculate individual score if at least 70 percent of items constituting the mean score were not missing. Descriptive statistics (mean, median, standard deviation, range) were calculated for each factor.

Using 2017 survey data, descriptive statistics were calculated for trainee responses. Non-parametric statistics (Kruskal-Wallis) were conducted to test for any statistically significant differences between responses by profession for the four core program domains as well as other key program elements of the VA CoEPCE. Significant differences were followed up by a multiple comparison post hoc test for Kruskal-Wallis analysis using the Dunn–Nemenyi approach SAS[®] macro, adjusted for multiple comparisons [20].

Results

The survey was administered to 164 trainees across the seven VA CoEPCE sites. A large number of missing items were identified for 24 respondents, and therefore those results were not included in the analyses. Data from the remaining 140 respondents were used to analyze the psychometric qualities of the survey items. Respondents included physician residents ($n = 65$; 41.9%), nurse practitioner students ($n = 18$; 21.3%), nurse practitioner residents ($n = 15$; 9.7%), pharmacy residents ($n = 25$; 16.1%), psychology fellows ($n = 12$; 7.7%), social work interns ($n = 3$; 1.9%), and physical therapy residents ($n = 2$; 1.34%).

Exploratory factor analysis

Measures relating to precepting, supervising, and mentoring indicated a two-factor structure, while the seven other measures indicated a one-factor structure using both Kaiser criterion (eigenvalues > 1) as well as parallel analysis criteria (see Table 1). The analysis of the precepting, supervising, and mentoring measure revealed a two-factor structure based on both the eigenvalues/scree plot as well as parallel analysis.

Table 1. Exploratory factor analysis and internal consistency reliability for the VA CoEPCE core program domains and key program elements

| Instrument | Number of items | Retained factors | Cronbach coefficient alpha |
|---|-----------------|------------------|----------------------------|
| <i>Core program domain subscales</i> | | | |
| Interprofessional collaboration | 4 | 1 | 0.85 |
| Shared decision-making | 5 | 1 | 0.87 |
| Sustained relationships | 4 | 1 | 0.89 |
| Performance improvement | 4 | 1 | 0.89 |
| <i>Key program elements subscales</i> | | | |
| Overall CoEPCE satisfaction | 12 | 1 | 0.93 |
| Precepting, supervising, and mentoring: | | 2 | |
| Within your own profession | 3 | | 0.91 |
| From other professions | 3 | | 0.96 |
| System impacts | 9 | 1 | 0.93 |
| Program practices | 7 | 1 | 0.90 |

For those measures that had more than one factor—precepting, supervising, and mentoring—principal component analysis was used with oblique varimax rotation. Items displaying simple structure (i.e., factor loading > 0.5 on a factor and at least twice as high relative to the other factors) were retained and grouped into one factor. Rotated factor pattern using varimax rotation indicated two factors: precepting, supervising, and mentoring “within profession” with three items (Factor 1), and “outside profession” also with three items (Factor 2). Table 2 presents loading for a two-factor structure for precepting, supervising, and mentoring. All items loaded strongly and uniquely on Factor 1 and Factor 2, respectively, giving a well-determined simple structure. Communalities for all items were greater than 0.6 (0.62, 0.80, 0.79, 0.89, 0.66, 0.78).

Table 2. Rotated factors pattern for the precepting, supervising, and mentoring measure

| Varimax rotated factor pattern: Precepting, supervising, and mentoring subscale | | |
|---|-------------------------------|------------------------------|
| Items | Outside profession (Factor 1) | Within profession (Factor 2) |
| Precepting by faculty within your own profession | 0.22 | 0.91 |
| Precepting by faculty from other professions | 0.91 | 0.29 |
| Supervising by faculty within your own profession | 0.39 | 0.88 |
| Supervising by faculty from other professions | 0.94 | 0.29 |
| Mentoring by faculty within your own profession | 0.31 | 0.88 |
| Mentoring by faculty from other professions | 0.90 | 0.33 |

Based on factor structure, respective mean scores were generated for each of the seven instruments that indicated a one-factor structure. Means were calculated as described in the data analysis section and used in analysis for all measures with single-factor structure. Precepting, supervising, and mentoring were scored by calculating summarized means, having grouped the three items pertaining to the category forming each domain: “Within your own profession” and “From other professions,” respectively (see Table 3).

Table 3. Trainee responses by profession

| | Overall | Physician Resident | Nurse Practitioner student | Nurse Practitioner Resident | Psychology Fellow | Pharmacy | p-value |
|---|-----------|--------------------|----------------------------|-----------------------------|-------------------|-----------|-------------------|
| Days/week spent at Clinic as CoEPCE training, <i>n</i> (%) | | | | | | | <0.0001 |
| 1-2 days | 86 (64.2) | 43 (66.2) | 17 (94.4) | 0 (0.0) | 8 (66.7) | 18 (72.0) | |
| 3-4 days | 28 (20.9) | 9 (13.9) | 1 (5.6) | 12 (85.7) | 3 (25.0) | 3 (12.0) | |
| 5 days | 20 (14.9) | 13 (20.0) | 0 (0.0) | 2 (14.3) | 1 (8.3) | 4 (16.0) | |
| To what extent has CoEPCE achieved overall mission, <i>n</i> (%) | | | | | | | 0.0261 |
| Not at all | 2 (1.5) | 2 (3.1) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | |
| Slightly | 3 (2.2) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 3 (12.0) | |
| Somewhat | 16 (11.9) | 7 (10.8) | 1 (5.6) | 4 (26.7) | 1 (9.3) | 3 (12.0) | |
| Mostly | 69 (51.1) | 36 (55.4) | 6 (33.3) | 5 (33.3) | 9 (75.0) | 13 (52.0) | |
| Completely | 45 (33.3) | 20 (30.8) | 11 (61.1) | 6 (40.0) | 2 (16.7) | 6 (24.0) | |
| Indicate your professional collaboration or team work with different professions for patient care, <i>n</i> (%) | | | | | | | 0.3305 |
| Occasionally | 20(15.6) | 6(9.8) | 4(22.2) | 2(13.3) | 4(33.3) | 4(18.2) | |
| Most of the time | 58(45.3) | 32(52.5) | 4(22.2) | 7(46.7) | 5(41.7) | 10(45.5) | |
| Always | 50(39.1) | 23(37.7) | 10(55.6) | 6(40.0) | 3(25.0) | 8(36.4) | |

Internal consistency reliability

Internal consistency reliability for the domains is high: interprofessional collaboration (Cronbach’s alpha = 0.85); shared decision-making (Cronbach’s alpha = 0.87); sustained relationships (Cronbach’s alpha = 0.89); performance improvement (Cronbach’s alpha = 0.89); overall CoEPCE satisfaction (Cronbach’s alpha = 0.93); system impacts (Cronbach’s alpha = 0.93); program practices (Cronbach’s alpha = 0.90); and precepting, supervising, and mentoring “Within your own profession” (Cronbach’s alpha = 0.91) and “From other professions” (Cronbach’s alpha = 0.96), respectively (see Table 1).

Survey results

To compare trainee experiences by profession, data from 135 of the 140 respondents who completed the survey was evaluated. Social work interns (*n* = 2) and physical therapy residents (*n* = 3) were excluded from the analyses due to small sample sizes. VA CoEPCE trainees were generally positive regarding their VA CoEPCE training experience. The majority of trainees mostly (51.1%) or completely (33.3%) agreed

that the VA CoEPCE achieved its overall mission to “foster transformation of clinical education by preparing graduates of health professional programs to work in and lead patient-centered interprofessional teams that provide coordinated, longitudinal care.” As part of VA CoEPCE, most trainees (64.2%) spent an average of one to days a week in a VA CoEPCE clinic. Only nurse practitioner residents (85.7%) spent three to four days per week at a VA CoEPCE clinic as part of their clinical training. Trainees indicated they had professional collaboration or teamwork with different professions for patient care always (39.1%) or most of the time (45.3%) (see Table 3).

Table 4 presents overall distribution and comparisons by profession on the four core program domains (interprofessional collaboration, shared decision-making, sustained relationships, and performance improvement) and key program elements, such as overall satisfaction with the VA CoEPCE; the effectiveness of precepting, supervising, and mentoring; system impact; and program practices. Responses among physician residents, nurse practitioner students, nurse practitioner residents, psychology fellows, and pharmacy residents were compared. The professions did not differ significantly on the four core domains; precepting, supervising, and mentoring; or program practices. They differed significantly, however, on overall satisfaction and system impacts ($p = 0.005$ and $p = 0.001$, respectively) (see Table 4). Post hoc comparisons indicated that compared with nurse practitioner students, pharmacy residents were overall less satisfied with the VA CoEPCE training program ($p = 0.001$). Pharmacy residents ($p = 0.007$) and psychology fellows ($p = 0.005$) rated system impacts lower when compared with nurse practitioner students ($p = 0.001$). Similarly, physician residents also rated the system impact of training lower when compared with nurse practitioner students ($p < 0.05$). Scores for pharmacy residents were lower, though not statistically significantly different, on precepting, supervising, and mentoring within and outside their profession compared to other trainee groups.

Table 4. Core program domains and key program elements by profession

| | Overall | Physician resident | Nurse practitioner student | Nurse practitioner resident | Psychology fellow | Pharmacy resident | <i>p</i> -value |
|--|-----------|--------------------|----------------------------|-----------------------------|-------------------|-------------------|-----------------|
| <i>Core program domain subscales</i> | | | | | | | |
| Interprofessional collaboration (<i>n</i>) | 133 | 64 | 18 | 15 | 12 | 24 | 0.9780 |
| Mean (SD) | 4.1 (0.6) | 4.2 (0.7) | 4.3 (0.6) | 4.4 (0.6) | 4.3 (0.5) | 4.3 (0.7) | |
| Median (IQR) | 4.3 (1.0) | 4.3 (1.3) | 4.4 (0.8) | 4.3 (1.0) | 4.5 (0.8) | 4.3 (1.1) | |
| Shared decision-making (<i>n</i>) | 133 | 64 | 18 | 15 | 12 | 24 | 0.3150 |
| Mean (SD) | 4.1 (0.7) | 4.1 (0.7) | 4.3 (0.5) | 4.0 (0.6) | 4.0 (0.4) | 3.9 (0.8) | |
| Median (IQR) | 4.0 (1.0) | 4.0 (1.0) | 4.2 (0.8) | 4.0 (1.0) | 4.0 (0.4) | 4.0 (0.9) | |

Table 4 (continued)

| | Overall | Physician resident | Nurse practitioner student | Nurse practitioner resident | Psychology fellow | Pharmacy resident | p-value |
|---------------------------------------|-----------|--------------------|----------------------------|-----------------------------|-------------------|-------------------|---------------|
| <i>Core program domain subscales</i> | | | | | | | |
| Sustained relationships (n) | 132 | 63 | 18 | 15 | 12 | 24 | 0.2224 |
| Mean (SD) | 4.1 (0.7) | 4.1 (0.7) | 4.3 (0.5) | 4.3 (0.6) | 3.9 (0.2) | 3.9 (0.9) | |
| Median (IQR) | 4.0 (1.0) | 4.0 (1.0) | 4.4 (1.0) | 4.3 (1.0) | 4.0 (0.3) | 4.0 (1.0) | |
| Performance improvement (n) | 132 | 63 | 18 | 15 | 12 | 24 | 0.6355 |
| Mean (SD) | 3.8 (0.9) | 3.7 (0.9) | 3.9 (0.8) | 3.8 (0.9) | 3.6 (0.6) | 3.9 (0.9) | |
| Median (IQR) | 4.0 (1.0) | 4.0 (0.8) | 4.0 (1.0) | 4.0 (1.3) | 3.5 (0.6) | 4.0 (1.6) | |
| <i>Key program elements subscales</i> | | | | | | | |
| Overall satisfaction (n) | 125 | 61 | 16 | 15 | 12 | 21 | 0.0045 |
| Mean (SD) | 4.3 (0.7) | 4.3 (0.8) | 4.7 (0.3) | 4.3 (0.6) | 4.3 (0.4) | 3.9 (0.9) | |
| Median (IQR) | 4.5 (0.8) | 4.5 (0.8) | 4.9 (0.5) | 4.6 (0.9) | 4.3 (0.5) | 3.9 (1.3) | |
| Precepting / supervising / mentoring | | | | | | | |
| Within profession (n) | 125 | 61 | 18 | 15 | 12 | 19 | 0.0888 |
| Mean (SD) | 4.6(0.7) | 4.7(0.5) | 4.7(0.5) | 4.3(1.0) | 4.7(0.9) | 4.2(0.9) | |
| Median (IQR) | 5.0(0.7) | 5.0(0.3) | 5.0(0.5) | 5.0(1.0) | 5.0(0.3) | 4.7(1.7) | |
| Outside profession (n) | 101 | 43 | 17 | 14 | 8 | 19 | 0.0722 |
| Mean (SD) | 4.4(0.9) | 4.2(1.0) | 4.7(0.6) | 4.7(0.4) | 4.3(1.0) | 4.1(1.0) | |
| Median (IQR) | 4.7(1.0) | 4.3(1.0) | 5.0(0.3) | 5.0(0.3) | 4.5(0.7) | 4.0(1.3) | |
| System impacts (n) | 135 | 65 | 18 | 15 | 12 | 25 | 0.0014 |
| Mean (SD) | 4.4(0.6) | 4.4(0.6) | 4.7(0.5) | 4.4(0.4) | 4.1(0.4) | 4.2(0.7) | |
| Median (IQR) | 4.4 (0.9) | 4.3(1.0) | 4.9(0.2) | 4.4(0.9) | 4.1(0.7) | 4.1(1.1) | |
| Program practices (n) | 134 | 64 | 18 | 15 | 12 | 25 | 0.2401 |
| Mean (SD) | 4.1 (0.7) | 4.1 (0.7) | 4.4 (0.7) | 4.2 (0.8) | 4.0 (0.6) | 4.0 (0.7) | |
| Median (IQR) | 4.1 (1.1) | 4.0 (0.9) | 4.5 (0.9) | 3.0 (1.3) | 4.0 (1.1) | 3.9 (0.9) | |

Discussion

The number of IPE programs designed to improve the delivery of healthcare in the United States has increased rapidly [21]. Unlike specialized IPE programs, the VA CoEPCE IPE program simultaneously delivered a standardized IPE postgraduate curriculum to learners from multiple disciplines (nurse practitioner residents, nurs-

ing students, physician residents, psychology fellows, and pharmacy residents) at seven geographically diverse VA facilities across the United States. Unique to this program, the VA CoEPCE curriculum was delivered in the primary care clinic setting to allow trainees from different professions to practice IPE skills in real time with learners from other professions with feedback from IPE faculty. The Trainee Participant Survey was developed to detect differences in curricular perceptions and identify unmet needs by profession in order to make programmatic changes to meet the needs of all learners. No tool has been previously developed to evaluate a standardized curriculum to compare perceptions across multiple professions.

Further, few survey instruments used to measure IPE program outcomes for healthcare teams have been formally evaluated [3,8,22-25]. Data to assess the psychometric validity and reliability of these tools is limited [6-8,26]. As part of VA CoEPCE evaluation activities, an exploratory factor analysis was conducted to examine the psychometric qualities and factor structure of each of the four core domains and key program elements of the survey. Internal consistency reliability was high for each of the four core program domain subscales (interprofessional collaboration, shared decision-making, sustained relationships, and performance improvement) as well as for the key program element subscales, including overall VA CoEPCE satisfaction, system impacts, and program impacts. A one-factor structure provided the best fit to the data for all sections of the survey, with the exception of the precepting, supervising, and mentoring component, which resulted in two factors.

The psychometric qualities of the survey were consistent with other published IPE healthcare measurement tools. For example, the Interprofessional Collaborative Competency Attainment Survey, which is based on a set of interprofessional care competencies, reported slightly higher Cronbach's alpha coefficients ranging between 0.94 to 0.98, while the VA Medical Team Training Survey, which contains items related to communication and teamwork among physicians, ranged between 0.78–0.85 [22,23]. However, unlike other IPE healthcare survey instruments, this survey is the first to be developed for measuring trainee perceptions of a standardized, multisite IPE program and system impacts, across trainees from multiple professions, including physician residents, nurse practitioner students, nurse practitioner residents, psychology interns, and pharmacy residents. The survey was developed specifically for program evaluation purposes and to identify gaps in the current curriculum based on the needs of each profession. As IPE programs for clinical trainees continue to expand globally, this survey fills a gap in the validated measurement tools readily available to assess perceptions of IPE programs across multiple professions in primary care, regardless of geographic location or clinic population.

No significant differences in responses were observed across all professions related to knowledge, skills, and practice for the four core domains. These findings suggest consistency in the delivery of VA CoEPCE training related to these competencies. However, differences in trainee overall satisfaction with the VA CoEPCE training program and system impacts were observed across professions. Nurse practitioner students rated overall satisfaction with the VA CoEPCE training program significantly higher compared to pharmacy residents. Training programs for phar-

macy and psychology trainees were less standardized and highly dependent on VA CoEPCE faculty at each training site, which likely led to significant variation in training experiences. While providing a standardized curriculum for physicians and nurse practitioner trainees was mandated at the onset of the program in 2013, a standardized curriculum was not required for pharmacists and psychologists until 2016. In addition, national program directors for pharmacy and psychology were mandated in 2016 to help create more structure for the pharmacy and psychology trainees. Another consideration is that pharmacy and psychology trainees may have different thresholds for reporting satisfaction based on expectations that are specific to their professions [4]. Although responses were not corrected for this possible bias, the VA CoEPCE program has been working on standardizing expectations for each specialty training program across all sites to address this issue. Assessments were also specifically developed for the CoEPCE nurse practitioner program, whereas other professions did not have a dedicated trainee assessment component. For example, nurse practitioner residents completed a formal self-assessment and mentor assessment at one month, six months, and at the completion of the program. Nurse practitioner residents also generally spent more days at the VA CoEPCE primary care clinic during the year, thereby gaining more exposure to VA CoEPCE faculty and resources than other trainees.

System impacts were rated lowest among psychology and pharmacy trainees. In addition to the issues previously raised that may have contributed to differences in overall satisfaction, this finding could partly be due to local expectations for psychology and pharmacy trainees that may not have been as well articulated.

The results of this survey were used to improve the quality of IPE delivered at the VA CoEPCE sites. Each site received a report of its own results, compared to de-identified national results. Data were used to identify strengths, weaknesses, and areas for improvement at individual sites. Sites were encouraged to have discussions with other sites to identify best practices for IPE within a particular domain. For example, the data identified one site with high scores in the reflective practice instructional strategy, and other sites held discussions with this site to improve their own practices in this area. Low-performing sites were generally receptive to working with high-performing sites to improve the delivery of their IPE curricula.

Overall response rate was relatively high (58% across all sites), although some sites had response rates less than 50 percent. Response rates improved when sites followed up with their own email request to trainees. Response rates were similar to other IPE surveys for trainees [26-28]. However, the small number of trainees from some professions coupled with low response rates at some sites limited the generalizability of results, the ability to analyze data, and the ability to detect differences in pairwise comparisons.

This survey can serve as a model for evaluating future IPE training programs. The items in the trainee survey were found to be psychometrically valid, consisting of eight subscales with high internal consistency reliability. Results from the 2017 trainee survey also confirmed the consistent delivery of the VA CoEPCE core domains across professions. Although overall program satisfaction varied by profession, these find-

ings offer guidance for program improvement efforts. The application and further validation of this tool as part of other multidisciplinary IPE programs would be informative. Future work is also needed to develop specialty specific assessment methods for IPE programs with trainees from multiple professions in a primary care setting.

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Appendix



Centers of Excellence in Primary Care Education
Graduate Participant Survey
April 2017

The purpose of this survey is to understand the impact (in your current work or training) of your experience in the VA Centers of Excellence in Primary Care Education (CoEPCE) training program. This will help us to improve training for future graduates. Your participation in this survey is greatly appreciated.

Respondent Information

* 1. Please indicate your former CoEPCE VA training site.

- Boise
- Cleveland
- Greater Los Angeles
- Houston
- San Francisco
- Seattle
- West Haven

* 2. When did you finish your training in the CoEPCE?

- 2012
- 2013
- 2014
- 2015
- 2016
- 2017

* 3. Please indicate the amount of time you spent as a trainee in the CoEPCE.

- Less than 6 months
- 6-12 months
- Greater than 1 but less than 2 years
- At least 2 but less than 3 years
- 3 or more years

* 4. Please select your professional affiliation:

- Nurse
- Nurse Practitioner
- Pharmacist
- Physician
- Psychologist
- Social Worker

Other (please specify)

Advanced Training

* 5. Have you participated in an advanced training program, such as a full-time fellowship or another graduate degree program since completing the CoEPCE training program?

- Yes
- No

* 6. What is your current status in your advanced training program?

- Currently enrolled
- Completed

* 7. What is the name of the advanced training program you are currently enrolled in or have completed?

* 8. To what extent do you feel the advanced training program values your CoEPCE training experience?

- Not at all
- To some extent
- To a great extent
- Not sure

* 9. Do you feel the skills you acquired during your CoEPCE training experience improved your chances of getting into an advanced training program?

- Not at all
- To some extent
- To a great extent
- Not sure

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Employment

* 10. Are you currently employed in a paid position?

- Yes
- No

* 11. What is your current position title?

* 12. Please select up to 3 activities that describe how you spend your time in your current position.

- Direct patient care
- Administration/ Management
- Educator
- Researcher
- Evaluation/Quality Improvement
- Other (please specify)

* 13. Do you feel that your CoEPCE training experience improved your chances of finding a job?

- Yes
- No
- Not sure

* 14. To what extent do you feel your current employer values your CoEPCE training experience?

- Not at all
- To some extent
- To a great extent
- Not sure

* 15. How much ongoing professional contact do you have with other trainees, alumni, or faculty from the CoEPCE training program?

- Never
- About once per year
- 2-6 times per year
- About once a month
- Several times a month

* 16. Are you currently employed by the VA?

- Yes
- No

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* 17. Are you currently employed in primary care?

- Yes
 No

* 18. Have you ever been employed by the VA since completing your CoEPCE training?

- Yes
 No

* 19. Have you ever been employed in a primary care setting since completing your CoEPCE training?

- Yes
 No

* 20. How likely are you to continue or seek future employment in the VA?

- Very unlikely
 Unlikely
 Neither likely or unlikely
 Likely
 Very likely

* 21. How likely are you to continue or seek future employment in primary care?

- Very unlikely
 Unlikely
 Neither likely or unlikely
 Likely
 Very likely

Mission and Program Achievements

The overall mission of the Centers of Excellence in Primary Care Education (CoEPCE) is to "foster transformation of clinical education by preparing graduates of health professional programs to work in and lead patient-centered interprofessional teams that provide coordinated, longitudinal care."

22. Based on your experience in the CoEPCE training program, to what extent do you feel the CoEPCE achieved the overall mission as stated above?

- Not at all
 Small extent
 Moderate extent
 Fairly great extent
 Extremely great extent

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Program Impacts

* 23. How would you rate the following statements about the CoEPCE training program?

| | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |
|--|-----------------------|-----------------------|----------------------------|-----------------------|-----------------------|
| Mentored trainees to identify personal career goals. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Prepared trainees for a career in primary care. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Prepared trainees to practice collaboratively in teams to provide coordinated care. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Provided opportunities for trainees to interact with preceptors from multiple professions. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Interprofessional Collaboration

* 24. Please rate the frequency with which you practice the following skills in your current role.

| | Never | Rarely | Sometimes | Very Often | Always |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Communicating with colleagues outside of my own discipline. | <input type="radio"/> |
| Providing clinical care as a member of an interprofessional team. | <input type="radio"/> |
| Valuing the unique expertise of other health professionals. | <input type="radio"/> |
| Communicating my roles and responsibilities clearly to other health professionals. | <input type="radio"/> |
| Constructively managing conflict with other providers. | <input type="radio"/> |

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Shared Decision-Making

* 25. Please rate the frequency with which you practice the following skills in your current role.

| | Never | Rarely | Sometimes | Very Often | Always |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Partnering with patients in healthcare decision-making. | <input type="radio"/> |
| Using motivational interviewing techniques with patients. | <input type="radio"/> |
| Using information systems and tele-health technologies to facilitate communication to enhance patient-centered care. | <input type="radio"/> |
| Engaging other health professionals in problem solving and shared accountability for healthcare outcomes. | <input type="radio"/> |
| Constructively managing conflict with patients and families/caregivers. | <input type="radio"/> |

Sustained Relationships

* 26. Please rate the frequency with which you practice the following skills in your current role.

| | Never | Rarely | Sometimes | Very Often | Always |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Facilitating warm hand offs to other providers. | <input type="radio"/> |
| Developing trusting relationships with patients and families/caregivers. | <input type="radio"/> |
| Communicating roles and responsibilities of team members clearly to patients and families/caregivers. | <input type="radio"/> |

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Performance Improvement

* 27. Please rate the frequency with which you practice the following skills in your current role.

| | Never | Rarely | Sometimes | Very Often | Always |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Collecting and analyzing data to assess performance improvement. | <input type="radio"/> |
| Using performance improvement strategies to increase the efficacy of team-based care. | <input type="radio"/> |
| Using information technology to manage patient panels. | <input type="radio"/> |
| Using reflective practice to identify opportunities for improvement. | <input type="radio"/> |

Overall Satisfaction

* 28. As you reflect back on your CoEPCE training experience, how would you rate your overall satisfaction with it?

- Highly dissatisfied
- Dissatisfied
- Neither satisfied or dissatisfied
- Satisfied
- Highly satisfied

29. How could the CoEPCE training program improve?