RESEARCH

Inclusion of the Pharmacist Patient Care Process in Doctor of Pharmacy Curricula

Aleda M. H. Chen, PharmD, PhD,[a] Margarita V. DiVall, PharmD, MEd,[b] Michael J. Gonyeau, PharmD, MEd,[b] Mary E. Kiersma, PharmD, PhD,[c] Teresa A. O'Sullivan, PharmD,[d] Jeannine M. Conway, PharmD,[e] Robin Zavod, PhD[f]

[a] Cedarville University, School of Pharmacy, Cedarville, Ohio
[b] Northeastern University, School of Pharmacy, Boston, Massachusetts
[c] Accreditation Council for Pharmacy Education (ACPE), Chicago, Illinois
[d] University of Washington, School of Pharmacy, Seattle, Washington
[e] University of Minnesota, College of Pharmacy, Minneapolis, Minnesota
[f] Midwestern University, College of Pharmacy, Glendale, Illinois

Objective. With the inclusion of the Pharmacists' Patient Care Process (PPCP) in the most recent Accreditation Council for Pharmacy Education standards, institutions must determine how best to vertically and horizontally integrate and assess the PPCP in the curriculum. The objective of this study was to identify the breadth and depth of PPCP implementation as well as faculty involvement in teaching the PPCP at ACPE-accredited institutions.

Methods. A survey to address the study objectives was developed, piloted, and distributed electronically to all US pharmacy institutions in candidate or accredited status. Electronic reminders were implemented to improve response rates. The data were analyzed descriptively.

Results. Approximately 70% of institutions responded to the survey. Integration of the PPCP was most often championed by an individual faculty member and/or a committee. Practice faculty taught PPCP at nearly all institutions, while only a third of survey respondents reported that foundational and social administrative faculty taught the PPCP. Development related to PPCP curricular integration mainly focused on preceptors. Most institutions integrated the PPCP through the didactic and experiential curriculum in an approach that allowed for reinforcement or mastery of concepts. There were limited integration efforts into interprofessional education. Institutions had a plan for assessing the effectiveness of the integration, but were varied in their approach.

Conclusion. Institutions have embraced integrating the PPCP into their curricula, didactically and experientially. Progress still needs to be made regarding inclusion of all faculty in teaching the PPCP as well as integrating the PPCP into other key curricular areas, such as interprofessional learning. Faculty development efforts may be beneficial to address these aspects.

Keywords: Pharmacists' Patient Care Process, curriculum, assessment, survey

INTRODUCTION

Unveiled in 2014 by the Joint Commission of Pharmacy Practitioners (JCPP) and integrated into the Accreditation Council for Pharmacy Education (ACPE) Standards 2016, the Pharmacists' Patient Care Process (PPCP) represents a framework by which the pharmacist can consistently provide care, demonstrate value, and effectively communicate how pharmacists contribute to patient care as vital members of the health care team.[1-3] It also is an opportunity for all pharmacy disciplines, not just practice faculty and preceptors, to share how they contribute to patient care.[4] In response to the JCPP report and its integration into the ACPE Standards 2016, many sessions and discussion forums have been held at professional meetings to provide programs an opportunity to understand and strategize how to instruct and implement the PPCP.

Several institutions have shared their approaches to integrating the PPCP. For example, case-based learning

Corresponding Author: Aleda M. H. Chen, Cedarville University, School of Pharmacy, 251 N. Main St., Cedarville, OH 45314. Tel: 937-766-7454. Email: amchen@cedarville.edu

modules with videos have improved student-perceived overall PPCP knowledge and integration, along with enhanced ability to collect patient information.[5] Also, integration of comprehensive patient cases grounded in the PPCP have improved quiz and examination scores, along with self-assessed achievement of course objectives.[6] Less common in the literature are examples of multi-course integrations or collaborations across pharmacy disciplines. There are a few notable exceptions. Taylor and colleagues demonstrated an increase in P1 students' ability to align patient care experiences encountered during introductory pharmacy practice experiences (IPPEs) to the steps of the PPCP.[7] Alsharif and Faulkner incorporated the PPCP in a medicinal chemistry course, where a pharmaceutical sciences faculty member and a clinical faculty member collaborated to ensure foundational science content along with the application component to practice. This integration resulted in improved understanding of the PPCP and also fostered student understanding of how the foundational sciences provide essential information for the PPCP.[8] Other faculty have integrated the PPCP throughout disease-based modules in the curriculum that included lecture materials, faculty guidance documents, and patient cases.[9] In this study, quizzes and examinations were administered throughout the year to assess student competency. The efforts enhanced student skills in the PPCP, particularly in the "Collect" and "Implement" domains, and improved faculty understanding and implementation of the PPCP.[9] Each of these examples represent a collaborative effort between disciplines and/or integration across courses.

While examples of integration exist in the literature, no academy-wide exploration of approaches to integrating and assessing the PPCP has been undertaken. Further, it is unknown the extent to which other pharmacy disciplines (eg, basic sciences, social and administrative sciences) are embracing the opportunity to explain how they contribute to the PPCP. Thus, the objective of this study was to identify the breadth and depth of PPCP implementation and faculty involvement in teaching the PPCP across ACPE-accredited institutions and to identify successful practices and opportunities for improvement of teaching and assessing the PPCP.

METHODS

Researchers developed a web-based survey (Qualtrics, Inc, Provo, UT), using their expertise and results of a literature search focused on PPCP implementation across the academy, to collect data from all pharmacy programs on efforts to implement and assess the PPCP. As part of the survey development, researchers identified objectives for the study and created items related to each objective. These objectives included: identify the breadth and depth of

PPCP implementation, determine faculty and preceptor development related to the PPCP, describe methods used to teach and assess the PPCP, identify the impact of PPCP assessment on curricular change, and identify exemplars of PPCP integration. The research team members generated items, iterated to improve item clarity, and met to finalize the survey. After the research team agreed upon the final survey instrument, four faculty at different ranks at two institutions pretested the questionnaire and provided feedback.

The final survey instrument used skip logic and consisted of 21 to 27 questions plus three demographic questions. Definitions were given for terms, including horizontal integration (integrated systematically across multiple courses in the same semester), vertical integration (integrated systematically across multiple courses over multiple years with increasing complexity), and spiral integration (integrated systematically across multiple courses within a semester and over multiple years with increasing complexity, both horizontal and vertical) to increase the consistency in responses.

Cedarville University Institutional Review Board deemed the questionnaire exempt. On March 2, 2020, the survey invitation was emailed to 141 pharmacy program assessment leads. They were asked to contact investigators if the survey should be sent to an alternative individual and to complete only one survey per program, consulting with colleagues as needed. A PDF of the questionnaire was provided to assist with this request. Because of COVID-19 disruptions, we left the survey open through July 2020 and sent numerous Qualtrics-based reminders and emails and made phone call follow-ups to attain a satisfactory response rate. Responses were linked to pharmacy programs but analyzed collectively. The researchers computed descriptive statistics to analyze the data (SPSS, version 25.0, IBM, Armonk, NY). Inferential statistics (chi-square test) were performed to assess differences in responses by type of institution (public vs private). Partial open-ended responses were assessed thematically. The survey is available upon request.

RESULTS

Ninety-nine institutions responded (70.2% response rate). Approximately half were public institutions and half were private institutions and were similar to the demographic characteristics of pharmacy programs nationally (Table 1). There were no significant differences in responses based on type of institution ($p > .05$).

The main champions (64%) for the PPCP integration were either a faculty member with a primary teaching role or one or more committees. Assessment oversight of the PPCP was performed primarily (68% of respondents) by the school's assessment committee or office. Most schools had an intentional teaching and assessment plan for the

Table 1. Characteristics of Pharmacy Institutions Represented in a Survey on Inclusion of the Pharmacist Patient Care Process in the Doctor of Pharmacy Curriculum

Characteristic	Survey Results (N = 99), No. (%)	National Data (N = 141), No. (%)
Institution Type		
Private	52 (52.5)	75 (53.2)
Public	47 (47.5)	69 (48.9)
Accreditation Status		
Accredited	95 (96.0)	137 (97.2)
Candidate Status	4 (4.0)	4 (2.8)

PPCP (82%) and labeled or tagged the PPCP to this plan in a variety of assessment data (Table 2).

Teaching models varied across institutions and were split between one of three approaches: individual, collaboration within a department, or collaboration across departments. Pharmacy practice faculty taught the PPCP at 99% of institutions, while approximately 30.3% and 36.4% institutions, respectively, had basic or social/administrative sciences faculty teaching the elements of PPCP such as emphasizing how pharmacology of medications or social determinants of health contributes to the Assess step. There also was limited integration of the PPCP in interprofessional education, such as incorporating PPCP in the discussion of pharmacist professional roles and responsibilities (24% of institutions). Institutions used either a horizontal or spiral integration of the PPCP (96%), most commonly teaching to a mastery level in multiple courses across multiple years (48.5%) and often including experiential learning (35.4%). Traditional lecture-based learning was the most common pedagogy (94.8%). Active learning (eg, team-based learning, flipped classroom, and peer instruction) occurred in 50.4% of programs, along with integration in skills/practice laboratory (75.8%), patient cases (79.8%), and patient simulations/OSCEs (69.7%) (Table 3).

Assessment practices focused either on individual activities or a combination of individual activities and longitudinal attainment. Skills-based PPCP learning (eg, laboratory, cases, simulations) were the most commonly assessed areas. Institutions predominantly used rubrics, evaluations of introductory and advanced pharmacy practice experiences (IPPEs/APPEs), and examinations to assess student learning and competency achievement, although fewer respondents reported mapping or tagging these tools to assessment of student achievement of each step. Over half of institutions either had made changes to the curriculum as a result of the PPCP assessment data or were in the process of making changes (Table 4).

Table 2. Implementation of the Pharmacists' Patient Care Process (PPCP) in US Doctor of Pharmacy Programs (N=99)

Implementation Aspect	No. (%)
Key Champion/Driver for the PPCP	
Faculty member with primarily a teaching role	37 (37.4)
Faculty member(s) with primarily an experiential role	4 (4.0)
Faculty member(s) with primarily an administrator role	9 (9.1)
Committee(s)	26 (26.3)
Office(s)	14 (14.1)
Other	9 (9.1)
Primary Oversight for Assessing the PPCP[a]	
Individual faculty	60 (60.6)
Assessment committee	37 (37.4)
Assessment office	30 (30.3)
Other	13 (13.1)
Intentional Plan for PPCP Integration	
Intentional teaching plan	13 (13.1)
Intentional assessment plan	1 (1.0)
Intentional teaching and assessment plan	81 (81.8)
No intentional plan	4 (4.0)
Intentional Labeling/Tagging of the PPCP[a]	
Assignments	54 (54.5)
Lecture materials	69 (69.7)
Exam questions	53 (53.5)
Rubrics	50 (50.5)
Session learning outcomes	36 (36.4)
Course learning outcomes	65 (65.7)
Program learning outcomes	36 (36.4)
Program strategic plan	11 (11.1)
Other	13 (13.1)

[a] Respondents were instructed to select all that applied.

While most institutions provided preceptor training and development related to the PPCP, less than half provided faculty development. Even fewer institutions were engaging in scholarly work related to the PPCP (18%) or collaborating with other institutions (6%) (Table 5).

In the free text responses, 44 (44.4%) respondents commented on how their program provided professional faculty development. Most respondents described targeted programs provided at some point to faculty. A few respondents provided enough detail that ongoing or as-needed efforts to assess and discuss the PPCP were apparent. One respondent noted, "All clinical faculty must include references to [the] stage of PPCP in lecture and activity materials so all new faculty are introduced and brought up to speed on

Table 3. Approaches to Teaching the Pharmacists' Patient Care Process (PPCP) in US Doctor of Pharmacy Programs (N=99)

Teaching Approaches	No. (%)
Collaborative Teaching Model	
Individual	23 (23.2)
Collaboration within a single department	38 (38.4)
Collaboration across disciplines	38 (38.4)
Types of Faculty that Teach the PPCP[a]	
Pharmacy practice	98 (99.0)
Pharmaceutical/basic sciences	30 (30.3)
Social and administrative sciences	36 (36.4)
Experiential, including preceptors	78 (78.8)
Interprofessional Education (IPE) Integration of the PPCP	24 (24.2)
Professions Included in IPE Integration Efforts with the PPCP[a]	
Nursing	19 (19.2)
Medicine	16 (16.2)
Physical Therapy	7 (7.1)
Physician Assistant	14 (14.1)
Nurse Practitioners	6 (6.1)
Health Sciences	7 (7.1)
Other	8 (8.1)
Breadth of Course Integration	
Workshop/skills/practice lab series	13 (13.1)
Multiple courses in one year	2 (2.0)
Multiple courses in multiple years	48 (48.5)
Full integration (most courses) across the pre-APPE curriculum	1 (1.0)
Full integration (most courses) including experiential learning	35 (35.4)
Integration Approach	
Horizontal integration	4 (4.0)
Vertical integration	49 (49.5)
Spiral integration	44 (44.4)
Highest Level at which the PPCP is Taught	
Introductory	0 (0.0)
Reinforcement	25 (25.3)
Mastery	73 (73.7)
Primary Pedagogies Utilized to Teach the PPCP[a]	
Traditional, lecture-based	84 (84.8)
Team-based learning	44 (44.4)
Flipped classroom/peer instruction	25 (25.3)
Skills/practice lab	87 (87.9)
Patient cases	88 (88.9)
Patient simulations/objective structured clinical examinations (OSCEs)	73 (73.7)
Other	4 (4.0)
Assessment Occurring Alongside Pedagogy to Teach the PPCP[a]	
Traditional, lecture-based	49 (49.5)
Team-based learning	36 (36.3)
Flipped classroom/peer instruction	14 (14.1)
Skills/practice lab	75 (75.8)
Patient cases	79 (79.8)
Patient simulations/objective structured clinical examinations (OSCEs)	69 (69.7)
Other	5 (5.1)

[a] Respondents were instructed to select all that applied.

Table 4. Approaches to Assessing the Pharmacists' Patient Care Process (PPCP) at US Pharmacy Institutions (N=99)

Assessment Approaches	No. (%)
Broad-Level Approaches to Assessment	
Individual activities only	48 (48.5)
Longitudinal only	1 (1.0)
Individual and longitudinal attainment	48 (48.5)
Not assessed	1 (1.0)
Assessment Occurring Alongside Pedagogy to Teach the PPCP[a]	
Traditional, lecture-based	49 (49.5)
Team-based learning	36 (63.6)
Flipped classroom/peer instruction	14 (14.1)
Skills/practice lab	75 (75.8)
Patient cases	79 (79.8)
Patient simulations/objective structured clinical examinations (OSCEs)	69 (69.7)
Other	5 (5.1)
Tools to Assess the Progression of Student Achievement in Competencies[a]	
Rubrics	81 (81.8)
IPPE/APPE evaluations	72 (72.7)
Exams/quizzes	67 (67.7)
Survey-based instrument	14 (14.1)
Other	4 (4.0
Assessment Tools Mapped/Tagged to the Individual PPCP Steps[a]	
Rubrics	45 (45.5)
IPPE/APPE evaluations	42 (42.4)
Exams/quizzes	39 (39.5)
Survey-based instrument	9 (9.1)
Other	2 (2.0)
Experiential Performance Assessment Rubrics Contain PPCP Items	
APPE	21 (21.2)
IPPE and APPE	62 (62.6)
None	13 (13.1)
Made Changes to the Curriculum as a Result of PPCP Competency Assessment	
Yes	17 (17.2)
In process	35 (34.3)
No	46 (46.5)

[a] Respondents were instructed to select all that applied.

expectations." Further clarification also was provided regarding preceptor development by 64 respondents. While all described some form of training through a webinar, live presentation, or similar continuing education program, some described additional efforts. At least five respondents stated they dedicate time to the PPCP at their annual preceptor training program. One respondent mentioned that training in PPCP is part of their resident teaching certificate program. Three respondents explained that the PPCP was reinforced during site visits. Other initiatives mentioned by respondents included educational pieces about the PPCP in the quarterly preceptor newsletter, a professional development PPCP badge that preceptors can earn, and a PPCP "stress puck" distributed to all preceptors. Although only mentioned by a few respondents, use of the PPCP steps in rubrics used for student performance assessment by preceptors is probably widespread, as illustrated by one respondent who noted that, "given it is part of the performance evaluation used on IPPEs and APPEs, it is also mentioned in our rater training which is required for all preceptors."

Although 36 of 39 respondents described curricular changes made as a result of PPCP competency incorporation,

Table 5. Development and External Engagement Related to Implementation of the Pharmacists' Patient Care Process (PPCP) at US Pharmacy Institutions (N=99)

Approaches	N (%)
Collaboration with other institutions on teaching/assessing PPCP	6 (6.1)
Provide faculty professional development on the PPCP	48 (48.5)
Provide preceptor professional development on the PPCP	68 (68.7)
Engagement in scholarly publications related to the PPCP	18 (18.2)

only nine respondents identified a curricular change driven by assessment data indicating a student performance gap. For example, one respondent described the "skills lab changing the patient cases and rubrics based on identified weak areas." Three of these nine responses indicated that the student performance gap was identified prior to APPEs; none of the responses specifically noted curricular changes made because of student performance deficiencies seen on APPEs.

Eighteen respondents provided open ended exemplars of curricular PPCP integration: four commented on mapping the PPCP to their core curriculum and three discussed incorporating faculty outside the therapeutics courses (eg, pharmaceutical sciences faculty) in some aspect of PPCP training. Another respondent described partnering with another pharmacy school and a pharmacy technician program to create video training modules that would model pharmacists executing the PPCP in core APPE practice settings.

DISCUSSION

This study was the first national assessment of integration of the PPCP into pharmacy school curricula, which is a required element as part of the ACPE Standards 2016.[2] The PPCP was integrated into 96% of all responding institutions, with most having an intentional teaching and assessment plan incorporated into multiple courses and across different professional years. The extent of collaborative teaching varied, with pharmacy practice faculty being the most frequent teachers of the PPCP. While programs are assessing the PPCP, few schools had made changes to the curriculum based on the data.

There is high value placed on the PPCP by the profession; thus, it is important to accurately assess and utilize the data to inform student outcome attainment. While most institutions that participated in the study were mapping or tagging the PPCP in their assessment data, there was considerable variability in their approaches to tagging. Mapping is an important element in assessing adherence to educational standards and accreditation standards, as well as in determining curricular improvements.[10] Mapping also allows faculty to engage with assessment data, particularly if an electronic system is used, and for the institution to engage in continuous quality improvement.[11,12] Researchers have incorporated mapping into examinations and quizzes, rubric-based assessments, and practical examinations.[6,9,13] Responsibility for oversight of PPCP integration often falls on the faculty members providing instruction in addition to the assessment office or team. Proactive approaches to identifying curricular gaps, whether through committees, faculty members, or committee-faculty partnerships, are important.

Given the nature of the PPCP and its inherent relationship to practice, it is not surprising to see that the PPCP is taught by pharmacy practice faculty at nearly all institutions. While one-third of institutions have foundational and social/administrative sciences (SAS) faculty teaching the PPCP, there is certainly room for growth. The PPCP has many areas for integration of foundational science and SAS faculty. Each stage of the PPCP contains elements that are clearly linked to key SAS concepts, such as the social determinants of health, clear communication principles, and medication adherence.[1] For foundational sciences faculty, chemical and pharmacokinetic differences between agents used for the same condition could be linked to the assess and plan steps, when students need to choose between therapeutic options and defend their choice with reasoning. Alsharif and Faulkner provide an example of integrating the PPCP into a medical chemistry course, which was positively received and improved student understanding of the PPCP.[8] Other basic science faculty could consider similar approaches. Few programs indicated that they integrated faculty development related to the PPCP; perhaps development efforts could aid nonpractice faculty in determining their "fit" with the PPCP. Furthermore, while nearly all institutions have pharmacy practice faculty teaching the PPCP, it does not mean that *all* pharmacy practice faculty teach it. This would be an interesting area for further exploration.

The PPCP was also heavily integrated in experiential programs, particularly in IPPE and APPE evaluations. While 78% of institutions indicated that the preceptors are teaching the PPCP, there is clearly room for expanding the PPCP in experiential education. Another future area to examine will be whether the preceptors are teaching/modeling the PPCP or focusing on assessment of the PPCP. It is also unclear whether programs are using data from the APPE performance assessments to identify student knowledge, skills, or behavioral gaps that could be addressed on the curricular level. Research has found that pharmacists believe that the PPCP accurately reflects their practice,

and intentional assessment of the PPCP in IPPE experiences can be successful.[7,14] Preceptor development may be a successful avenue to promote intentional integration and assessment. For example, Hagel and colleagues integrated a case-based webinar which improved preceptor confidence in integrating the PPCP and assisted them in identifying methods for incorporating it.[15]

For most institutions, students receive repeated exposure to the PPCP through different courses, pharmacy practice laboratories, case-based learning, and experiential learning. Assessment is often occurring alongside teaching, but there are instances where it is being taught without formal assessment. The bigger challenge for institutions is using the data from assessment to drive competency attainment. At the time of survey distribution, 17% of respondents had made changes to the curriculum as a result of competency assessment, and another 34% were in the process of making changes. It seems that institutions are making a concerted effort to utilize the data and determine if and when it should drive change. There is less information on how experiential learning assessment data are being utilized, which could be a worthwhile area for future examination.

Interestingly, there is limited incorporation of the PPCP into interprofessional learning. While the PPCP is specific to pharmacy, the application is relevant to producing team-ready, practice-ready pharmacists. Given that a goal of implementing the PPCP is to consistently provide care, demonstrate our value, and effectively communicate how pharmacists contribute to patient care,[3] integrating the PPCP as part of interprofessional learning could be a valuable educational tool. This is particularly relevant when discussing the roles and responsibilities of pharmacists with other members of the team, which is a key element of interprofessional learning. The ACPE Standards further reinforce the need for interprofessional, collaborative care in Standard 10.8, where the curriculum should prepare students "to provide patient-centered *collaborative* care" as part of the PPCP. Further research efforts could focus on approaches to integrating and assessing the PPCP as part of interprofessional learning as well as the perceptions of other professions related to elements of the PPCP.

Our study has a number of limitations. The survey collected data only as a snapshot in time during the first part of 2020; thus, the data may not reflect current practices. This is particularly true considering changes that may have been necessary as part of the transition to online and hybrid learning because of the COVID-19 pandemic. Second, one survey per school was completed. The survey was sent to the assessment lead at each institution with a request to forward to the most appropriate person who is most familiar with PPCP integration into the curriculum. In some cases, the individual completing the survey may not have known all current practices related to the PPCP at the program. While the survey was pretested, items may not have been as clear to the respondents as the research team. For example, objective structured clinical examinations (OSCEs) were included in teaching and assessment columns as some institutions may integrate teaching OSCEs.[22] However, this could have been confusing to participants at institutions without an OSCE program. Finally, not all institutions responded to the survey, and this may have been because of challenges respondents faced with completing the survey in the midst of the COVID-19 pandemic.

CONCLUSION

While nearly all schools have integrated the PPCP into their curriculum and have determined approaches to assess students' performance, assessing PPCP related competencies in experiential education settings can be further improved. Additionally, engaging all faculty in teaching the PPCP related competencies need further examination. Faculty development efforts may need to focus in these areas if we are truly to develop our students into team-ready, practice-ready pharmacists who can consistently provide care, demonstrate value, and effectively communicate how pharmacists contribute to patient care.

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