INSTRUCTIONAL DESIGN AND ASSESSMENT

An Advanced Clinical Track Within a Doctor of Pharmacy Program

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Objective. To evaluate the advanced clinical track, a curricular track designed to prepare doctor of pharmacy (PharmD) students for residency training and institutional practice.

Design. The advanced clinical track required completion of elective coursework, an additional advanced practice experience, 8 clinical experiences, and a skills checklist, and participation in a clinical skills competition.

Assessment. Thirty-two graduates of the advanced clinical track were surveyed. Of the 23 respondents, 95% of those who pursued residency training were successfully matched with a residency program. Ninety-one percent of respondents felt that the advanced clinical track increased their confidence and 74% felt it was definitely an advantage when applying to a residency program. All participants agreed that the advanced clinical track met their expectations or goals and would recommend it to other students.

Conclusion. Completion of an advanced clinical track was viewed by PharmD graduates as valuable preparation for residency training and institutional practice and would be recommended to other students.

Keywords: students, curricular track, curriculum, residency, training, survey

INTRODUCTION

The Accreditation Council for Pharmacy Education (ACPE) states within its accreditation standards and guidelines that colleges and schools of pharmacy should be committed to providing a culture that respects and supports postgraduate professional education including residency training.¹ To meet that standard, colleges and schools of pharmacy have used various techniques to heighten student awareness of postgraduate pharmacy training such as providing online information,² brochures and faculty presentations as part of a career day program,³ mandatory seminars,⁴ and informational handouts with an associated educational forum,⁵ as well as offering more comprehensive programs involving an array of presentations and modules pertaining to residency training and the application process.⁶ The most common methods of promoting residency and fellowship training include providing formal and informal instruction, making referrals to preceptors, and involving residents and fellows in clerkship teaching.⁷ Additionally, colleges and schools of pharmacy partner with professional organizations to promote postgraduate training to pharmacy students. One example is

the American Society of Health-System Pharmacists (ASHP) Internet-based Web pages and video webinars.⁸⁻¹⁰

Colleges and schools of pharmacy have incorporated curricular tracks designed to promote residency training and/or prepare students for advanced clinical practice.^{7,11} In 2002, what was then the Medical University of South Carolina's (MUSC) College of Pharmacy developed an advanced clinical track. In 2006, the college merged with the University of South Carolina College of Pharmacy to form the South Carolina College of Pharmacy (SCCP). The objective of this study was to conduct the first formal survey of graduates of this track in order to evaluate the program's strengths, opportunities for improvement, and ability to prepare students for residency training and institutional practice. These results would be used in the development of a similar track for the SCCP curriculum.

DESIGN

The impetus for the development of the advanced clinical track was the desire to prepare graduates to be highly competitive for residency positions across the country. An additional goal was to better prepare students for practice in a hospital or institutional setting. In 2001, an ad-hoc committee made up of interested clinical faculty members was convened to develop the specific

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requirements for the advanced clinical track. The committee recognized that while the core curriculum, based on the 2000 ACPE Standards,¹² was designed to produce a generalist practitioner, elective coursework and practice experiences provided an opportunity to focus on more specialized areas of pharmacotherapy and broaden the student's exposure to direct patient care. Also reviewed were existing programs at other colleges and schools of pharmacy as well as the educational experiences of the 2001 applicants to our college's postgraduate year 1 (PGY1) residency program. This process resulted in the identification of 8 specific requirements to be completed in order for an advanced clinical track certificate to be awarded upon graduation (Table 1). Four classroom lecture-based elective courses were required, including Acute Care Therapeutics, which is an advanced pharmacotherapy course that predates the advanced clinical track and a seminar series entitled Track Conferences I-III, which was designed to prepare students for their practice experiences, residency search, and career choices. All of these courses were team taught and included a number of

visiting expert speakers on a wide variety of topics. Although these courses were open to all students, Track Conferences I-III were specifically designed for the advanced clinical track.

The curriculum required students to complete nine 1-month practice experiences consisting of 1 hospital, 1 community, 4 acute care practice experiences, and 3 elective practice experiences. An extra 1-month practice experience was added for the advanced clinical track, for a total of 10. In addition, advanced clinical track students were required to select clinical practice experiences, defined as experiences involving direct patient care with an interprofessional team, for all 3 elective experiences. Advanced clinical track students were also required to participate in the American Society for Health-System Pharmacy-Student Society of Health-System Pharmacy (AHSP-SSHP) clinical skills competition and to complete a skills checklist during practice experiences.

Certain aspects of the advanced clinical track are unique to our institution, while others were modeled after components of existing programs. For example,

Table 1. Requirements for Completion of the Advanced Clinical Track Within a Doctor of Pharmacy Program

Requirement	Description
1) All 3 elective must be clinical practice experiences (one-month, merit grade)	Three elective practice experiences chosen in the fourth professional year were required to involve direct patient care with an interprofessional team.
2) Complete an additional clinical practice experience (one-month, merit grade)	ACT students were required to complete an additional practice experience their fourth professional year for a total of 10 practice experiences (including the mandatory community and hospital practice experiences).
3) Acute Care Therapeutics course (third professional year, spring semester, 3 credit hours, merit grade)	A disease-oriented and organ-integrated approach to the care of patients with acute illnesses managed in the inpatient setting. This course focused on developing critical thinking and problem-solving skills by case-based synthesis, analysis, and application.
4) Track Conference I course (third professional year, spring semester, 1 credit hour, pass/fail)	A skills development course intended to prepare students for optimal performance on clinical practice experiences. The application of various skills commonly used in providing patient care (eg, nutrition, pharmacokinetics, note writing) was reviewed and practiced.
5) Track Conference II course (fourth professional year, fall semester, 1 credit hour, pass/fail)	A course designed to prepare the student for future training and career experiences. Topics included an introduction to residency and fellowship training, career opportunities in pharmacy, and presentation and interview skills. When applicable, the Resident Interactive Teaching Experiences, an interactive seminar series by MUSC's residents, was incorporated.
6) Track Conference III (fourth professional year, spring semester, 1 credit hour, pass/fail)	A course designed to further expose the student to special topics related to pharmacy careers and the professional work environment (eg, publishing, academia, item writing, counter-detailing). This course also incorporated the Resident Interactive Teaching Experiences.
7) Participate in the clinical skills competition	ACT students were required to participate at least once in the annual clinical skills competition of MUSC's chapter of ASHP-SSHP.
8) Complete a skills checklist	Students must demonstrate proficiency in 48 clinical skills that were approved and verified by preceptors during the fourth professional year.

Abbreviations: ACT = Advanced Clinical Track; ASHP-SSHP = American Society of Health-System Pharmacy-Student Society of Health-System Pharmacy; MUSC = Medical University of South Carolina.

the skills checklist was adapted from the University of North Carolina at Chapel Hill's School of Pharmacy's Pre-residency Track (J.E. Rodgers, personal communication, 2001). The number of required clinical practice experiences was primarily based on a review of the college's residency applicants. At that time, applicants to the college's PGY1 residency program had completed a mean of 8 (range = 5 to 11) month-long clinical practice experiences, while the college's PharmD curriculum required completion of only 7. Therefore, completion of an additional clinical practice experience was required for advanced clinical track students.

Administration of the advanced clinical track was led by a director who supervised the progress of enrolled students and worked closely with the coordinators of the required coursework, experiential director, and curriculum committee to ensure a consistent direction for the requirements. The advanced clinical track was marketed to students by a brief description during first-year pharmacy (P1) student orientation followed by an introductory presentation provided by the director at a standing class meeting early in the second (P2) year. In addition, the advanced clinical track was described in detail during a college-wide session designed to educate the students about available elective courses. The adequacy of the college's resources (ie, number of clinical practice experiences) was closely monitored on an annual basis. Students were informally polled during their P2 year to gauge interest in the advanced clinical track. During the years surveyed, there was no need to limit the number of participating students or for an application process. Students needed only to declare their interest in the advanced clinical track and successfully complete the requirements to be awarded a certificate upon graduation. While completion of the advanced clinical track was not noted on the student's official transcript, the courses and practice experience requirements for the advanced clinical track were noted.

EVALUATION AND ASSESSMENT

In July 2007, an anonymous, online survey instrument created using SurveyMonkey (SurveyMonkey, Menlo Park, CA) was sent via e-mail to graduates of our program who had completed the advanced clinical track since its inception in 2002. As the advanced clinical track requirements occur in the third and fourth year, the first graduating class with the opportunity to complete the advanced clinical track was the class of 2004. Between 2004 and 2007, 46 students declared their intention to participate in the advanced clinical track and 34 (74%) completed all of the necessary requirements. Viable e-mail addresses were available for 32 of the 34 graduates. The

survey instrument consisted of 22 questions, including demographic data and perceptions about requirements of the advanced clinical track (eg, elective coursework, practice experience requirements, overall value) using a 5-point ordinal scale. The survey instrument concluded with open-ended questions requesting overall perceptions of the advanced clinical track. One follow-up e-mail was sent to those graduates who had not responded within 4 weeks in order to increase participation. Data were collected through August 2007 and are presented in the form of descriptive statistics. This study was approved by the Institutional Review Board for Research with Human Subjects at MUSC.

Of the 32 graduates contacted, 25 responded to the online survey. However, 2 respondents provided only demographic data and were eliminated from the overall analysis, resulting in a 72% response rate. Table 2 provides demographic characteristics of the 23 included respondents. The graduates with pharmacy experience prior to entering pharmacy school (78%) largely held positions at community chains and/or hospital pharmacies (78% and 39%, respectively). Table 3 provides the relative importance of factors that motivated the former students to voluntarily undertake the additional requirements of the advanced clinical track. The desire to improve clinical knowledge ranked highest (rating median = 1), while being more competitive for a residency (rating median = 2) ranked second in importance. Figure 1 demonstrates that the majority of graduates found each aspect of the advanced clinical track to be extremely valuable or somewhat valuable.

Of the 23 respondents, 20 (87%) applied for pharmacy-related postgraduate training and 19 (95%) were accepted into practice residency programs. In comparison, the national match rate between 2004 and 2007 was 74% (K. Parkinson, e-mail communication, September 8, 2011).¹³ Eight (35%) respondents had progressed to second-year (PGY2) residencies and 1 graduate had progressed to, but chose not to complete, a PhD program.

All participants agreed or strongly agreed that the advanced clinical track was at an appropriate level of difficulty, and 96% of the participants agreed or strongly agreed that the time required to complete the track was appropriate. Ninety-one percent of the respondents agreed or strongly agreed that the advanced clinical track increased their confidence when applying to a residency program. Seventy-four percent felt that there was definitely an advantage when applying to a residency program, while 17% felt that there was somewhat of an advantage. Five of 10 graduates who applied for hospital-based residency positions indicated that there was definitely an advantage to having completed the

Table 2. Demographics of Respondents to a Survey of Pharmacy Graduates Who Completed the Advanced Clinical Track , N = 23

Characteristic	Number of Respondents (%)
MUSC graduation year	
2004 (total graduates = 9)	6 (26.1)
2005 (total graduates = 4)	3 (13.0)
2006 (total graduates = 11)	5 (21.7)
2007 (total graduates = 10)	9 (39.1)
Age	
Mean (SD) years	29.1 (3.56)
Years of pharmacy experience prior to enrollment	
None	5 (21.7)
< 6 months	3 (13.0)
6 months to < 1 year	4 (17.4)
1 to < 3 years	5 (21.7)
3 to 5 years	6 (26.1)
> 5 years	0
Completed degree prior to pharmacy school	
Yes	16 (69.6)
No	7 (30.4)
Type of degree obtained prior to pharmacy school ^a	
Associates	3 (18.8)
Bachelor of Arts	2 (12.5)
Bachelor of Science	13 (81.3)
Master of Business Administration	0
Other	1 (6.3)
Applied to residency or fellowship after graduation	
Yes	20 (87.0)
No	3 (13.0)
Current primary pharmacy practice site ^b	
Ambulatory	2 (8.7)
Community (chain)	1 (4.3)
Hospital/ institution	17 (73.9)
Managed care/ HMO/ PPO	1 (4.3)
Other	2 (8.7)

Abbreviations: HMO = health maintenance organization; PPO = preferred provider organization.

^a As indicated by responses to the previous survey item, only 16 of the 23 respondents completed a degree prior to pharmacy school. The 16 who responded regarding type of degree could choose more than 1 response.

^b None responded to being unemployed or currently employed in Community (Independent), Health department/ Public Health, Home Health Care/ Home Infusion, Nursing Home/ Extended Care, Pharmaceutical Company, University/ College Faculty.

advanced clinical track, while 4 felt that there was somewhat of an advantage. The remaining graduate stated that there was a “neutral effect” when applying to hospital-based positions. All participants agreed or strongly agreed that the advanced clinical track met their expectations or goals and felt they had the guidance to complete the track (Figure 2). Ninety-six percent of the graduates would definitely recommend the advanced clinical track to other students, while 1 graduate would recommend it with reservations based on the opinion that Track Conferences II and III and the clinical skills competitions were not valuable.

In response to the open-ended survey questions, participants stated that the most rewarding aspects of the advanced clinical track included having the opportunity to assess a patient as a whole person and not just a set of individual disease states; developing a broader clinical knowledge base; and having an advantage over peers when applying for residencies. Students commented that the primary advantage was the increased number of clinical practice experiences. The Acute Care Therapeutics elective course and the ability to complete additional clinical practice experiences also were highly regarded aspects of the program. The most frustrating aspects of the advanced clinical track for the graduates included redundancies in material covered and difficulty attending the Track Conference II and III courses when out of town completing APPEs. In addition, participants suggested more academic credit should be awarded for the Acute Care Therapeutics elective course.

DISCUSSION

Beginning in 2002, pharmacy students at MUSC had the option of participating in the advanced clinical track, a structured curricular track to better prepare them for residency training and/or institutional practice. The percentage of PharmD students successfully completing the advanced clinical track requirements was 19% in 2004, 6% in 2005, 15% in 2006, and 13% in 2007. Although other colleges and schools of pharmacy offer various strategies to introduce postgraduate pharmacy training, this is the first survey formally evaluating a curricular track designed to promote residency training to pharmacy students. Overall, the survey respondents accounted for 68% of all graduates who completed the advanced clinical track from 2004 to 2007. At the time of the study, these graduates were employed in various practice settings, with the majority practicing in a hospital or institutional setting, possibly because many of the respondents were still completing PGY1 or PGY2 residencies. Also, a majority of pharmacists with residency training tend to practice in hospital systems throughout their careers.¹⁴ A repeated comment among those surveyed was that

Table 3. Pharmacy Graduates' Motivation to Complete the Advanced Clinical Track, %

	Most Important	Second Most Important	Third Most Important	Fourth Most Important	Fifth Most Important	Rating Median
To improve my clinical knowledge (n = 23)	52.2	39.1	8.7	0	0	1
To be better prepared for practice experiences (n = 23)	0	29.7	56.5	13	8.7	3
To help me decide what I wanted to do in my career (n = 21) ^a	8.7	13.0	13.0	52.2	4.3	4
To be more competitive for a residency (n = 22) ^a	39.1	26.1	17.4	13	0	2
To prepare me to work in a hospital setting after graduation (not as a resident) (n = 11) ^a	0	0	4.3	8.7	34.8	5

^a Respondents could select "not important" if this reason had no impact on the decision to complete the Advanced Clinical Track.

personal motivation was the most important factor in their decision to complete the track. This characteristic is also suggested by the number of previous degrees obtained by the survey respondents prior to pharmacy school enrollment. As seen in Figure 1, the students who completed the advanced clinical track felt that the Acute Care Therapeutics course and requirement for additional clinical practice experiences were the most valuable aspects of the program. This may suggest that students with a desire to work with interdisciplinary teams in direct patient care may be drawn to complete the advanced clinical track.

The respondents also felt that completion of the advanced clinical track provided an advantage when applying to and participating in residency programs. Most graduates who applied to postgraduate training did go on to participate in a PGY1 program. In fact, the successful match rate of the advanced clinical track graduates exceeded that of the national average for this time period (95% vs. 74%, respectively). However, those graduates who did not apply to a residency program still provided positive feedback about the advanced clinical track in the open-ended responses and all stated that they would

Figure 1. Pharmacy students' responses regarding the value of components of an advanced clinical track within a doctor of pharmacy program.

Figure 2. Pharmacy students' overall assessment of an advanced clinical track within a doctor of pharmacy program.

recommend completing the track to other students. This demonstrates that the advanced clinical track can be used to prepare interested students for the residency experience, but its benefits may also extend to those who enter directly into practice.

Areas for improvement in the advanced clinical track were addressed within the open-ended questions. One common concern was the inability of students who were completing APPEs out-of-town to attend the Track Conference II and III courses. Although it was part of the original course designs to consider these absences as excused, the number of students completing practice experiences out of the area grew at an unanticipated rate. To address this issue, in 2007, these conferences were subsequently videotaped and students were required to view the recordings and submit a written summary of the content in order to receive credit for attendance. An additional recommendation was made to combine the Track Conference classes. As a result, in 2008, the Track Conference II and III courses were consolidated and offered in the form of a 1-day workshop.

To complete the advanced clinical track, students had to pay for an extra summer semester to cover the costs of the required additional APPE. Only 1 graduate mentioned this was a concern, possibly indicating that the increased cost was not viewed by most respondents as a major deterrent to completing the program. However, the opinions of students who did not begin or began but did not complete the advanced clinical track were not solicited in this survey, and their opinions about the

program may differ, including with respect to the additional cost.

Respondents also commented on the difficulty of the increased workload required to complete the advanced clinical track. The Acute Care Therapeutics elective course was offered during the same semester as one of the core curriculum therapeutics courses; both of which are time-intensive. One respondent suggested offering electives for the advanced clinical track earlier in the curriculum. To alleviate some of the pressure for students completing the advanced clinical track, core therapeutics courses were offered starting in the second semester of the second year in 2008. As of 2011, these courses are offered starting in the first semester of the second year.

Although 4 years of graduates are represented, this survey is still limited by the small sample size ($n = 32$). Another limitation is the lack of a comparator group as the students who did not elect to participate or who participated but did not complete the advanced clinical track were not surveyed. It may have been insightful to obtain their perspectives as these individuals may have not valued the skills and experiences gained from the track or may have encountered unrecognized difficulties in committing to or completing requirements for the advanced clinical track.

While the implementation of this program at other colleges and schools of pharmacy may prove beneficial to their students, certain aspects, such as the requirement for completion of multiple direct patient care practice experiences involving an interprofessional team, may be

difficult to achieve for colleges with fewer preceptors and practice experience opportunities. Such colleges and schools may need to develop alternative experiences outside of the practice experience to achieve similar results.

SUMMARY

The implementation of an optional advanced clinical track in a college of pharmacy was associated with successful pursuit of residency training by graduates of the program. Additionally, the program was viewed by graduates as valuable preparation for residency and institutional practice and would be recommended to other students. Results of this survey affirm continuation of the program and expansion of structured efforts to increase clinical experiences for pharmacy students.

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