

Pharmacy Fellowship Programs in the United States: Perceptions From Fellows and Preceptors

Denise H. Rhoney¹

Wayne State University College of Pharmacy and Allied Health Sciences, 105 Shapero Hall, Detroit MI 48202-3489

Valerie G. Brooks, J. Herbert Patterson and John A. Pieper

School of Pharmacy, University of North Carolina, Chapel Hill, NC 27599-7360

This paper reports on a survey that assesses preceptor and fellow attitudes, expectations, activities, and recommendations for pharmacy fellowships. Two separate questionnaires, one for preceptors and one for fellows were developed. Sixty-six of 117 preceptors (56 percent) responded and 57 fellows returned completed questionnaires. There was some degree of discrepancy between preceptors and fellows in the activities perceived as being accomplished during fellowship training. A significantly lower percentage of fellows believed they were involved in the initial and later stages of research including grant submission, IRB submission, research presentation, and manuscript submission as compared to preceptors perceptions of their fellows' activities. In addition, fellows indicated that a larger percentage of their time was devoted to clinical service and clerkship student supervision versus the time the preceptors thought their fellows were involved in these activities. The most commonly listed strengths and weaknesses of fellowship programs according to the fellow was appropriate time devoted to clinical research and too much time devoted to clinical practice, respectively. Forty-nine percent of preceptors listed the number of potential research projects as the major strength of their program with difficulty in finding funding as the major limitation. The majority of fellows who responded to the questionnaire were very satisfied with their fellowship experience and most of the preceptors felt that fellowship review by a committee such as the American College of Clinical Pharmacy would be valuable to their program.

INTRODUCTION

Approaches to training practitioners for careers as independent researchers vary among postgraduate pharmacy fellowship programs. The American College of Clinical Pharmacy (ACCP) and American Association of Colleges of Pharmacy (AACCP) have developed guidelines for fellowship programs and ACCP has established a fellowship review process(1). Unlike residency programs, however, there is no formal accreditation process for fellowship training.

Prior to 1986, there was a lack of conformity in the use of the terms "residency" and "fellowship". Therefore, potential existed for program applicants to be misled as to the goals and objectives of individual programs. In 1986, representatives from national pharmacy organizations met to establish common definitions for residency and fellowship training (2). The definitions that were established as a result of this conference are as follows:

A pharmacy residency is an organized, directed, postgraduate training program in a defined area of pharmacy practice. A pharmacy fellowship is a directed, highly individualized, postgraduate training program designed to prepare the participant to become an independent researcher(2).

The goal of fellowship training is to develop competency in the scientific research process which includes con-

ceptualizing, planning, conducting, and reporting research. The fellow should receive an individualized learning experience that focuses on the fellow's research interests and knowledge under the close instruction and direction of a qualified preceptor(1). A highly individualized experience is the trademark of a good training program. Upon completion of the program, the fellow should be capable of conducting collaborative research and functioning as a principal investigator.

The American Society of Health-System Pharmacists (ASHP) Research and Education Foundation began funding postgraduate fellowship programs in 1978(3). The objectives of these programs included: (i) development of pharmacists' research competencies and skills; (ii) investigation of pharmacy services and drug therapy needs; and (iii) preparation of scientists for careers in academia, corporations, and organized healthcare systems.

Despite agreement among pharmacy organizations on the definitions of residencies and fellowships, there is still concern over the variability in the quality of the research experience among programs identifying themselves as fellowships. Previous studies have evaluated the career paths and success of fellowship trained individuals; however, little is known about the attitudes, expectations, and activities of current fellows and preceptors(3,4).

The specific objectives of this survey were to: (i) determine fellow and preceptor attitudes and expectations towards postgraduate pharmacy fellowship training; (ii) assess fellow activities in postgraduate pharmacy fellowship

¹Corresponding author and address: Detroit Receiving Hospital, 4201 St. Antoine Boulevard, Detroit MI 48201; E-mail: drhoney@dmc.org

Table I. Geographic distribution of survey recipients and survey responses

Geographic region	Number preceptor recipients	Number preceptor responses	Number fellow responses
New England (CT, ME, MA, NH, RI, VT)	4	1	5
Middle Atlantic (DE, MD, NJ, NY, PA, VA, DC, WV)	21	11	9
South Atlantic (FL, GA, NC, SC)	12	10	11
East North Central (IL, IN, MI, OH, WI)	21	11	6
East South Central (AL, KY, MS, TN)	20	9	8
West North Central (IA, KS, MN, MO, NE, ND, SD)	20	13	13
West South Central (AR, LA, OK, TX)	7	4	3
Mountain West (AZ, CO, ID, MT, NV, NM, UT, WY)	4	2	1
Pacific (AK, CA, HI, OR, WA)	8	5	1

Table II. Characteristics of respondents

Characteristic	Percent respondents	
	Preceptors (N=66)	Fellows (N=57)
Age (years):		
20-30	3.1	72
31-40	47.7	28
41-50	46.1	0
>50	3.1	0
Gender:		
Female	20	58.9
Male	80	41.1
Academic degrees ^a		
BS	66.2	59.6
PharmD	93.8	94.7
MS	7.7	5.3
PhD	6.2	1.8
Other	0	3.5
Specialized training ^a		
General residency	37.9	28.1
Specialized residency	13.6	19.3
Fellowship	57.6	N/A
Year of fellowship:		
1st	N/A	42.1
2nd	N/A	43.9
3rd	N/A	5.3
4th	N/A	8.8

^aRespondents may have completed more than one degree or training program.

training programs; and (iii) collect fellow and preceptor suggestions for improving postgraduate pharmacy fellowship training.

METHODOLOGY

Questionnaire Development

Two questionnaires were designed to gather information that characterized fellow and preceptor attitudes and expectations toward postgraduate pharmacy fellowship training. Two draft questionnaires were prepared and given to five previous fellows and five preceptors at the University of North Carolina at Chapel Hill School of Pharmacy. The pilot information collected included suggestions on the clarity, format, and content of the questions and the length of time required to complete the survey. All questionnaires

were returned from the pilot phase. Revisions were made and a final 25-item questionnaire for the preceptor and a 20-item questionnaire for the fellow were developed. Both the fellow and preceptor questionnaires were divided into two sections. The first section included questions about the fellowship program such as factors that were important in choosing a fellowship/fellow, activities accomplished during the fellowship, percentage of time devoted to fellowship activities, strengths/weaknesses of the fellowship, source of funding, form of employment pursued after the fellowship, and general satisfaction. The second section, which was optional, requested demographic information. The majority of the questions were either check boxes or items to be ranked. The questionnaires were anonymous (respondents could identify themselves if desired) and were designed to take 15 minutes or less to complete.

Study Sample

Cover letters and questionnaires with return postage paid were distributed on June 6, 1995 to 117 different fellowship programs. Table I shows the geographic distribution of survey recipients. The majority of the survey recipients were in the Middle Atlantic, East North Central, East South Central, and West North Central regions of the United States. The surveys were mailed directly to the preceptor of each program. The preceptor was asked to respond to the questionnaire and distribute a fellow questionnaire to all of their current fellows. The survey sample was identified utilizing the ACCP Directory of Residencies and Fellowships, ASHP position listings, ASHP Foundation, and peer reporting.

Data Analysis

Data was coded, entered, and verified by the investigators. PC SAS version 6.08 (Statistical Analysis System, Cary, NC) was used to tabulate and analyze the data. Descriptive statistics were compiled for all fellow and preceptor respondents. Additionally, chi square analysis was performed to compare preceptor and fellow responses regarding activities accomplished by the fellows during the fellowship program. The a priori level of significance was 0.05.

RESULTS

Characteristics of the Respondents and the Fellowship Programs

Of the 117 surveys sent to fellowship preceptors, 66 (56 percent) returned completed surveys and 57 fellow surveys were returned. A response percentage for fellows cannot be determined since the number of fellows in a particular

Table III. Factors important to preceptors in choosing a fellow

Factor	Percent preceptors (N=66)
Motivation	92.3
Communication skills	72.3
Career goals	67.7
Professional recommendations	53.8
Creativity	44.6
Prior clinical experience	43.1
Prior research experience	35.4
Reputation of programs completed	32.3
Pharmacy practice residency experience	27.7
Specialty residency experience	15.4
Other ^a	10.8
Recommendation from current/previous fellows	1.5

^aOther includes: integrity/honesty, patient care skills, performance in didactic courses, ability to work with others, hard working, and self-direction.

Table IV. Factors important to fellows in choosing a fellowship program

Factor	Percent fellows (N=57)
Preceptor	88.6
Ongoing research	84.1
Overall reputation of the fellowship program	77.3
Clinical setting	52.3
Teaching opportunities	45.5
Geographic location	40.9
Laboratory facilities	29.5
Availability of funding	29.5
Availability of coursework	20.5
Availability of pharmaceutical company experience	18.2
Fellowship reviewed and recognized by ACCP	6.8
Other ^a	4.5

^aOther includes: publications of past fellows, amount of time spent in research, amount of time spent in pharmacokinetic/pharmacodynamic modeling, amount of time spent in laboratory work, and not listed.

program was unknown. Table I shows the geographical distribution of both the preceptor and fellow respondents. Similar to the distribution of the recipients, the majority of the responses were from the Middle Atlantic, South Atlantic, East North Central, and West North Central areas of the United States. The majority of the preceptor respondents were men 31-50 years of age who had completed a PharmD degree and a fellowship program (Table II). Of the preceptor respondents 19.7 percent offered fellowships in pharmacokinetics/pharmacodynamics, followed by cardiology (18.2 percent), and infectious diseases (13.6 percent).

Approximately 36 percent of all fellowship programs were funded by the pharmaceutical industry with 30 percent coming from local research programs/foundations, personal grant funds, National Institute of Health, or various colleges of medicine. Colleges or schools of pharmacy and hospitals represented 10.6 and 17.9 percent of fellowship funding, respectively. Interestingly, national pharmacy organizations including ACCP and ASHP only represented 2.8 and 5.4

Table V. Percentage of fellows time spent in various activities according to preceptors and fellows

Activity	Mean percent of time±SD	
	Preceptors (N=66)	Fellows (N=57)
Clinical Practice	12.7 ± 12.5	10.7 ± 12.7
Didactic Teaching	12.6 ± 10.5	4.9 ± 3.9
Clerkship Student Supervision	12.1 ± 10.7	4.9 ± 6.1
Clinical Research	24.3 ± 14.6	36.0 ± 24.9
Laboratory Research	8.8 ± 12.5	19.9 ± 20.4
Coursework	N/A	3.9 ± 5.7
Travel	3.9 ± 4.1	N/A
Writing	7.8 ± 5.8	12.6 ± 9.4
Professional Presentations	3.7 ± 3.6	4.2 ± 4.3
Administrative	11.6 ± 12.8	1.9 ± 3.2
Other	2.5 ± 8.1 ^a	1.0 ± 6.6 ^b

^a Other includes: department/college meetings, maternity leave, professional organizations, secretarial activities, personal education, resident bedside teaching, residency program development, fellow mentoring, pharmaco-economic research, nonpharmacy lectures, and professional service.

^b Other includes: outcomes research, job hunting, precepting pharmacy students (non-clerkship).

percent of the funding, respectively.

The majority of fellow respondents were 20-30 years of age and had a PharmD degree (Table II). Only 28.1 percent and 19.3 percent completed a pharmacy practice residency or a specialized residency, respectively (Table II). There was nearly an equal number of respondents in either the first or second year of their program and the most common fellowship specialty areas included cardiology (21.1 percent) and infectious diseases (19.5 percent).

Factors Important in Choosing a Fellow and a Fellowship Program

The preceptor respondents were asked to evaluate factors that were important for them in recruiting a fellow (Table III). The most important factors included: motivation (92.3 percent), communication skills (72.3 percent), career goals (67.7 percent), and professional recommendations (53.8 percent). Factors that were least important included recommendation from current/previous fellow (1.5 percent), specialty residency experience (15.4 percent), and pharmacy practice residency experience (27.7 percent). Respondents were also given the opportunity to write down other factors which were not contained on the survey that were important in their recruiting process. Some of these factors included: integrity/honesty, patient care skills, performance in didactic courses, ability to work with others, work ethic, and self-direction.

Fellow respondents were similarly asked to evaluate factors important to them in choosing a fellowship program (Table IV). The most important factors included: primary preceptor for the fellowship (88.6 percent), ongoing research at the fellowship site (84.1 percent), the overall reputation of the fellowship program (77.3 percent), and the clinical setting (52.3 percent). Least important factors included: fellowship that is reviewed and recognized by ACCP (6.8 percent), availability of pharmaceutical industry experience (18.2 percent), availability of coursework (20.5 percent), availability of funding (29.5 percent), and laboratory facilities (29.5 percent). Additionally, geographic location

Table VI. Activities accomplished as part of fellowship training

Activity	Percent respondents		
	Preceptor (N=66)	Fellow (N=57)	P value
Development of scientific hypothesis and experimental methods to test the hypothesis	97	84.2	0.014
Preparation and submission of a grant proposal	87.9	70.2	0.017
Submission of a protocol to IRB	93.9	77.2	0.008
Research experiences including study conduct and data collection	98.5	93.0	NS
Experience in statistical analysis	98.5	91.2	NS
Preparation and submission of abstract(s) and manuscript(s) for publication	98.5	89.5	0.033
Formal presentation of research	93.9	68.4	0.001
Participation in journal clubs, research workshops, and seminar series	93.9	94.7	NS
Instruction in biomedical science ethics	34.8	36.8	NS
Requirement of graduate level coursework	54.5	47.4	NS
Participation in didactic teaching	93.9	82.5	NS
Participation in clerkship student supervision	69.7	82.5	NS
Participation in clinical service	66.7	78.9	NS
Clinical research scientist experiences of study monitoring	59.1	59.6	NS
Participation in Phase I-III clinical drug development	65.2	57.9	NS
Participation in Phase IV clinical research	43.9	38.6	NS
Pharmacokinetic modeling	54.5	57.9	NS

NS = not statistically significant.

(40.9 percent) and teaching opportunities (45.5 percent) were also important in the decision process. Many fellows also listed other factors important in choosing a fellowship such as publications of past fellows, and time spent in research pharmacokinetic/pharmacodynamic modeling, and animal laboratory work.

Activities Accomplished During Fellowship Programs

Table V is a comparison between preceptor and fellow assessments of the percentage of time spent in various activities. As expected, preceptors spent more time teaching and in administrative activities, whereas fellows were more involved with writing and conducting laboratory work.

Survey respondents were asked to evaluate activities that were accomplished by fellows in the fellowship programs (Table VI). These activities were based on ACCP guidelines for the types of experiences that should be offered by a fellowship program(4). Responses from the preceptors and fellows were compared to determine if significant differences existed between both groups' perceptions of time spent in these fellowship activities. Preceptors believed that their fellows spent more time performing various research related activities (development of research proposals, preparation and submission of grant proposals, abstracts, and manuscripts, and formal presentation of research) than their fellows ($P<0.05$). Although not statistically significant, fellows perceived more time spent supervising students and performing clinical duties compared with preceptor's perceptions of their fellow's activities.

Strengths and Weaknesses of the Fellowship Programs

Preceptor identified strengths and weaknesses of fellowship programs are listed in Table VII. Overall the majority of respondents indicated the following to be strengths: availability of research projects (88.9 percent), availability of their time as a mentor (76.2 percent), writing opportunities (76.2 percent), teaching opportunities (69.8 percent), availability of collaborative research (66.7 percent), funding

for research projects (65.1 percent), availability of coursework (57.1 percent), and availability of journal clubs, research workshops, or seminar series (57.1 percent). Weaknesses were perceived to be: funding for research projects (55.4 percent), funding for the fellowship program itself (55.4 percent), availability of their time as a mentor (42.9 percent), fellow inexperience (39.3 percent), and coursework availability (33.9 percent).

Table VIII reflects the fellows perceptions of the strengths and weaknesses of their program. Strengths included: time devoted to writing (92.6 percent), mentoring by preceptor (88.9 percent), time devoted to clinical research (77.8 percent), time devoted to teaching (74.1 percent), and presentation at scientific meetings (72.2 percent). Perceived weaknesses included: time spent in clinical practice (44.4 percent), stipend and benefits (33.3 percent), availability of course work (31.5 percent), time devoted to laboratory work (25.9 percent), and availability of funding for research projects (25.9 percent).

Fellow Employment and Satisfaction/ACCP Fellowship Review

Preceptors were asked about the type of employment their past fellows pursued upon completion of their fellowship. The majority pursued either full-time faculty (44.4 percent) or clinical practice (25.4 percent) positions. Only 15.8 and 5.4 percent sought industry positions or continued their education, respectively. Other types of positions included employment in contract research organizations, managed care organizations, federal agencies, or working as private consultants. The current fellows were asked to comment on their pursuit of various career paths. The majority of respondents (77.2 percent) planned to look for full-time faculty positions, while 33.3 percent were looking for clinical practice positions, 26.3 percent industry positions, and seven percent hoped to continue their education. Some respondents were planning to pursue more than one type of position.

Table VII. Strengths and weaknesses of fellowship programs as perceived by preceptors

Characteristic	Percent respondents	
	Strength (n=56)	Weakness (n=63)
Availability of research projects	88.9	0
Availability of time as mentor	76.2	42.9
Funding for research projects	65.1	57.1
Funding for fellowship	44.4	55.4
Fellow time devoted to clinical research	81	8.9
Fellow time devoted in pharmaceutical industry sponsored trials	38.1	12.5
Fellow time devoted to laboratory research	52.4	19.6
Coursework availability	57.1	33.9
Teaching opportunities	69.8	14.3
Opportunity for fellow presentation	73	14.3
Availability of journal clubs, research workshops, and seminar series	57.1	16.1
Writing opportunities	76.2	10.7
Fellow experience/inexperience	11.1	39.3
Stipend/benefits	19	30.4
Availability of collaborative research	66.7	10.7
Availability of clinical practice	46	10.7
Opportunity to work with other fellow/residents/graduate students	50.8	19.6
Other	14.3 ^a	16.1 ^b

^aOther strengths include: overall strength of faculty in department, previous accomplishments of faculty, MD as co-preceptor, and opportunity for experience in drug development and technology center.

^bOther weaknesses include: poor candidate pool to select fellows, lack of ACCP review, lack of funding, lack of collaboration with analytical work, difficulty recruiting due to geographic location, lack of training in grant writing and funding strategies, and candidates for fellowship want residency and fellowship training all in just two years.

Fellow satisfaction was addressed in a series of three questions. When asked if they would enter their current fellowship program again, 100 percent of respondents indicated that they would. In addition, 98.2 percent would advise a peer to consider their current fellowship program. Fellows were asked to rate overall satisfaction with their fellowship program using a Likert scale from 1 to 5. Approximately 88 percent were very or extremely satisfied and 12 percent were only moderately satisfied with their current program. No respondents indicated that they were unsatisfied with their program.

The preceptors were also asked to express their opinions on the value of the fellowship review. At the time of the survey, only 23.1 percent of the respondents had had their fellowship program reviewed by the Fellowship Review Committee of ACCP. Greater than 75 percent of preceptor respondents felt that fellowship review by a committee would be valuable for their program.

Respondent Comments

Preceptors were given the opportunity to comment on future plans to improve or change their programs. Forty (60.6 percent) respondents wrote one or more comments.

Table VIII. Strengths and weaknesses of fellowship program as perceived by fellows

Characteristic	Percent respondents	
	Strength (n=54)	Weakness (n=54)
Time spent in clinical practice	57.4	44.4
Mentoring by preceptor	88.9	20.4
Time devoted to clinical research	77.8	22.2
Time devoted to pharmaceutical industry sponsored clinical trials	46.3	16.7
Time devoted to laboratory work	55.6	25.9
Availability of coursework	51.9	31.5
Time devoted to teaching	74.1	22.2
Presentation at scientific meetings	72.2	5.6
Availability of journal clubs, research workshops, and seminar series	59.3	16.7
Time devoted to writing	92.6	16.7
Availability of funding for research projects	61.1	25.9
Opportunity for collaboration	59.3	16.7
Opportunity to work with other fellows/residents/graduate students	59.3	20.4
Feedback from preceptor	37	20.4
Stipend/benefit	35.2	33.3
Availability of multiple preceptors	42.6	13
Other	11.1 ^a	29.6 ^b

^aOther strengths include: availability of opportunities in outcomes research, independence, committee appointments in the pharmacy school collaboration with other health professionals, combination of clinical and basic science, well balanced fellowship, and fellowship designed to meet individual needs.

^bOther weaknesses include: grant writing, lack of preceptor feedback slow patient recruitment, slow IRB turnaround time, split two-year program at different settings, insufficient time to complete a project length of fellowship (one year), no weaknesses, funding, no technical support in the laboratory, unable to present research results at the sponsoring company, no formal performance reviews, no time for laboratory research, and geographical location.

Eleven (27.5 percent) respondents had plans to add more structure to their program. Five (12.5 percent) respondents were searching for multi-year funding support to increase the number of fellows in their program. Three (7.5 percent) respondents planned to pursue the ACCP fellowship review process and the same number wanted to provide possibilities for more collaborative work during the fellowship. Approximately five percent of respondents were considering awarding a MS degree upon completion of the program. A like percentage would like to incorporate a molecular biology component into their research program. Other comments included: making stipends more competitive, emphasizing pharmacoeconomic issues, improving the fellow recruitment process, improving clinical practice component, developing courses in research design and statistical analysis, increasing fellowship length to three years, and adding a laboratory component.

The fellows were also asked to provide comments or suggestions for improving their current program. Twenty-six (45.6 percent) fellows provided comments in this section. Four (15.2 percent) responded that there was a need for increased mentoring and increased structure in the pro-

gram. Three (11.5 percent) suggested that required coursework be added and three recommended that the preceptors provide more feedback to the fellow. Other comments included: increasing the time for writing, decreasing time spent collecting blood specimens and patient recruitment, increasing time spent on research projects, decreasing administrative responsibilities, incorporating performance reviews throughout the program, increasing the stipend, increasing teaching opportunities, increasing time for data analysis, identifying projects earlier during the program in order to allow completion, allowing the fellow to work on projects outside the preceptor practice area, decreasing laboratory work, and improving technical support in the laboratory.

DISCUSSION

A nation-wide survey of this nature evaluating attitudes and expectations of postgraduate fellowship training, has not been conducted prior to this study. Since there are no accreditation standards for fellowship training, the quantity and quality of the research experience was felt to vary among programs identifying themselves as fellowships. Although fellowship training standards should be based on the needs of the individual fellow, we believe that the findings of this study may help define the attitudes, expectations, and activities of current pharmacy fellowship programs as a whole. In addition, the results may provide insight on how pharmacy fellowship training may be improved to meet the needs of the profession in developing independent researchers.

There are several limitations to this study. The response rate from the preceptors was relatively good compared to usual survey response rates especially when one considers that reminder notices were not sent out. Unfortunately, the fellow response rate could not be determined since there is no record of the numbers of current fellows. Therefore, the investigators had to rely on preceptors to distribute the survey to their fellows. In addition, some fellowship preceptors may not have been identified in our search and subsequently not included in the study. In a 1985 survey, 115 fellowship programs were offered in 25 topic areas and it was projected that the number of programs offered would grow to more than 400 by the year 2000. Therefore, it is possible that we did not include all programs in our database (5). Another limitation of the study was the time of the mailing. Surveys were mailed out in June 1995 when many preceptors were preparing for new fellows and fellows were either completing their program or moving into the second year of their training. The investigators mailed these questionnaires out later in the fellowship year thinking that the fellow would have an adequate length of time left in their program and would thus be able to complete the questionnaire. However, response rates may have been better if the surveys were sent out during a less "hectic" month. Lastly, many respondents for both questionnaires were reluctant to list weaknesses of their fellowship programs. Even though the questionnaires were anonymous, individuals may have thought that the questionnaires were coded and therefore, cautious of discussing weaknesses.

A small percentage of the current fellows had residency training prior to entering their fellowship. The responding preceptors recognized this and made comments regarding the clinical inexperience of their fellows and how some fellow candidates wished to receive residency (clinical) and

fellowship (research) training during their fellowship experience. Interestingly, when looking at the factors that were considered most important in choosing fellows, less than half of the preceptor respondents felt that prior clinical experience or residency training was important in their decision process.

Some of the preceptor respondents commented on possibly increasing the length of their program to three years in order to award a MS degree or provide more clinical training. Other preceptors commented that the necessity for development of independent pharmacy researchers will decrease with the changing pharmacy curriculum and the subsequent need for more nontenure track clinical faculty. Interestingly, many fellow respondents listed the lack of a clinical component in their program as a weakness. In order to prevent young pharmacists from enrolling in a fellowship program believing this will sharpen clinical skills, colleges of pharmacy need to provide more guidance to the students regarding postgraduate training. A survey in 1993 found that most students pursue residency or fellowship training to gain knowledge and experience and for the desire to seek specialized training(4). The investigators found that colleges of pharmacy that offered an entry-level PharmD degree and involved preceptors, residents, and fellows in the students' training were more likely to have graduates pursue either fellowship or residency training. The survey did not differentiate between factors that motivated students to choose residencies versus fellowship programs(4).

The desired career paths chosen by past and current fellows range from the pursuit of full-time faculty positions to obtaining additional education. The majority of fellow respondents in this study were planning to look for full-time faculty positions. These results are similar to those of a 1990 survey of the past recipients of ASHP Foundation Fellowships. This study surveyed ASHP Foundation Fellows to determine their chosen professional paths and the impact of fellowships on their careers(3). Most of the respondents worked primarily in academia or had some teaching component to their position(3).

Funding for fellowship programs seems to be split across various sources with the majority coming from pharmaceutical industry, personal grants, local research programs, and colleges of medicine. Limited funding is provided by national pharmacy organizations such as ASHP and ACCP. Over 50 percent of the preceptors indicated that weaknesses of their programs were the lack of funding for both the fellowship and fellow research projects. Fellow respondents also felt that a weakness of their program was the lack of available funding for their research projects. Some preceptors commented that they may eventually have to close their programs due to lack of funding while others indicated that they are searching for multi-year funding in order to increase the number of fellows they train. If the profession is in need of developing an increased number of independent researchers, funding for their training appears to be a critical issue.

Overall, current fellows seem to be extremely satisfied with their experience and would complete the same program again or recommend a peer to consider their program. As expected the majority of the fellows time was spent in clinical research. Both preceptors and fellows felt that the lack of availability of coursework was a limitation to their program and suggested that new classes be developed or requirement for certain courses should be added. Each

group expressed the need for increased structure in their fellowship programs along with scheduled performance reviews. Most fellows felt that mentoring by their preceptor was a strength and preceptors believed that their availability of time as a mentor was a positive component to their program.

The types of activities that were perceived to be accomplished by fellows and preceptors during the fellowship varied between groups. The activities included in the survey were experiences that the ACCP developed as guidelines for directing fellowship programs(1). Compared with preceptor perceptions, fellows believed they were involved to a lesser extent in research activities. Interestingly, fellows still listed the time devoted to clinical research as a strength of their fellowship. In the area of clinical research, it is often difficult to provide a fellow with a project that can be conceived and completed during their training period. Often-times, fellows become involved in multiple projects in order to get experience in the whole research process. Formal performance review and evaluation may help eliminate any discrepancies between fellows and preceptor's perceptions on the type of activities necessary for optimal learning.

ACCP has established guidelines and a formal process for voluntary peer review of research fellowship training programs. This review process was designed to assure quality in fellowship programs and assist preceptors in improving their fellowship program. The goal of this review process is not to standardize fellowship experiences but to assure that minimal criteria for research training is met(1). Of the preceptor respondents, only 23 percent have had their program reviewed by this committee. However, approximately 77 percent indicated that this review process would be valuable for their program. Of note, ACCP review of a

fellowship program was not an important factor when choosing a fellowship program. Instead, the reputation of the preceptor, the ongoing research, and reputation of the program played a more significant role in deciding which fellowship program is best for a particular individual.

CONCLUSIONS

Literature describing pharmacy fellowship training has been limited to evaluating the number and type of fellowships offered and professional paths chosen upon completion of a fellowship. We assessed activities of fellows and attitudes toward the fellowship program of preceptors and their fellows. Although there was a discrepancy between preceptors and fellows in the activities perceived as being accomplished during the fellowship training, the majority of fellows who responded to the questionnaire were very satisfied with their fellowship experience. Preceptors also felt that fellowship review by a committee would be a valuable asset to their program.

Am. J. Pharm. Educ., **62**, 290-296(1998); received 3/31/98, accepted 7/10/98.

References

- (1) "ACCP 1998 Directory of Residencies and Fellowships," American College of Clinical Pharmacy, Kansas City MO (1998).
- (2) Anon, "Definitions of pharmacy residencies and fellowships," *Am. J. Hosp. Pharm.*, **44**, 1142-1144(1987).
- (3) Crawford, S.Y. and King, C.M., "Professional paths chosen by past recipients of ASHP Foundation fellowships," *ibid.*, **49**, 2948-2953(1992).
- (4) Bucci, K.K., Knapp, K.K., Phri, L.K. and Brooks, P.J., "Factors motivating pharmacy students to pursue residency and fellowship training," *Am. J. Health-Syst. Pharm.*, **52**, 2696-2701(1995).
- (5) Kaul, A.F., Janosik, J.E. and Powell, S.H., "Postgraduate pharmacy fellowships (1985-86)," *Drug Intell. Clin. Pharm.*, **20**, 203-208(1986).