Current Practices and Anticipated Changes in Academic and Nonacademic Admission Sources for Entry-Level PharmD Programs

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The purpose of this study was to describe and compare current admission practices with anticipated changes in academic and nonacademic admission information sources for entry-level PharmD programs. An author-constructed survey collected data from pharmacy programs on current and anticipated admission processes. After follow-up efforts, a 92 percent response rate was achieved. Results suggest that a lack of significant changes can be expected between admission practices used for the Fall 1997 entering class and those anticipated for Fall 2000. Likewise, applicant qualities sought and information sources used to measure these qualities are not expected to change significantly prior to the Fall 2000 entering class. This study indicated that most pharmacy programs utilize academic and nonacademic admission information sources and that they feel they are meeting the adopted ACPE Standard and Guideline 16.3 which requires that pharmacy programs use information sources in the admission process other than academic information.

INTRODUCTION

Pharmacy program admission practices are responding to changes within the profession, the educational environment, and to increased applicant competition. An indication of this occurrence is the increasing number of programs requiring applicant interviews[1,2]. In a survey of member institutions, the American Association of Colleges of Pharmacy (AACP) reported that 68 percent of the pharmacy programs required interviews for individuals applying for admission to Doctor of Pharmacy (PharmD) programs during the 1998-99 academic year[2]. In comparison, 43 percent of member schools required interviews for the 1990-91 academic year[3]. This increase may indicate that nonacademic qualities, as measured by the interview, are becoming more important in admission decisions.

AACP publishes the Pharmacy School Admission Requirements which documents information on admission requirements for each pharmacy program in the United States[3]. This publication includes information on each program's admission requirements (*e.g.* grade point average, pharmacy college admission test (PCAT), and interview). However, it does not include the way these information sources are used by pharmacy programs or the criteria used to assess nonacademic characteristics or measures in the selection process[4,5]. The purpose of this study is to describe and analyze the current and anticipated changes in admission practices among schools of pharmacy in the United States by answering the following research questions:

1. Is there a difference between the way that academic and nonacademic information sources are used by colleges of pharmacy in their admission practices as compared to future uses?
2. Is there a difference between the nonacademic qualities that pharmacy schools currently assess in applicants and the nonacademic qualities they expect to assess in the future?
3. Will the current admission information sources used to assess the nonacademic qualities differ from the future?

For the purposes of this study, current was defined as the practices which were used to admit Fall 1997 applicants. Future was defined as those practices which are expected to be used for the Fall 2000 admitted class. The Fall 2000 class was chosen as the future point for two reasons. First, the new accreditation standards American Council of Pharmaceutical Education (ACPE) will go into effect with students who enter professional entry-level PharmD programs for the academic year 2000. Therefore, it is possible that admission practices will change between those used in the 1997-98 academic year and those anticipated for the 2000-01 academic year. Second, some schools may have decided upon changes but not yet implemented them.

BACKGROUND

A literature review on admissions uncovered information primarily for the medical school admission process and procedures. In the competitive medical student pool, those admitted are primarily selected by academic variables, such as grade point average or standardized test scores, which are useful to determine the applicants who are likely to be successful academically[6]. Conversely, this data may indicate those who are likely to be unsuccessful in completion of the program, thus resulting in high costs to the student and the institution. However, the Carnegie Council also notes that sole reliance on these academic measures alone is insufficient for determining a candidate's likelihood of success.

McGaghie argues that since the ideal of the medical profession includes nonacademic qualities, they should be considered along with academic qualities in the admission process[7]. These nonacademic qualities are defined as those features of an individual's character, personality, and/or personal and social history that may contribute to their success as a health professional.

Likewise for pharmacy applicants, Duncan Hewitt suggests that a variety of nonacademic characteristics should be considered during the admission process in addition to an adequate background of knowledge and skills. These nonacademic qualities include communication skills (written, verbal, and nonverbal), information processing skills (including computer literacy), general thinking skills of critical thinking and reasoning, and the specific thinking skills of problem-solving and decision making, interpersonal and group skills, disposition to self-learn, and affective qualities[8].

Since the nonacademic variables are often believed to be a key part of professional competence and most conspicuous when absent, widespread recognition exists in medical schools that candidates should be evaluated prior to admission[7]. Abilities and ethical values are critical attributes for members of a caring profession; the attainment of which is the product of both the selection of students with potential for effective service and the subsequent participation of students in high-quality programs of education. Therefore, McGaghie suggests that demographic and other nonacademic data should supplement academic information in the selection of students[7].

The following nonacademic qualities appear in multiple literature sources that discuss characteristics to assess prior to admission:

- Motivation to enter the professiona[9-14]
- Oral and/or written communication skills[8, 9, 12, 15, 16]
- Interpersonal relations[2, 7, 12, 13]
- Leadership[7, 12]
- Maturity[13, 16]

- Service orientation[7, 8]
- Work habits[7, 16]
- Supportive and encouraging behavior[8, 14]
- Responsible actions[8, 16]
- Problem-solving skills[8, 16]
- Character and Integrity[7, 12]
- Ethics[13, 15, 16]

After deciding which nonacademic qualities will be assessed in the admission process, the admission information sources should be determined. The pharmacy literature, as well as other health care professional literature, provides some initial insight regarding the information sources to be used. Using these qualities and any qualities identified in future pharmacy research, the next decision is to determine the rating or importance of these sources.

In 1986 and again in 1993, medical school admission officers were asked to list the sources of information considered in processing applications and to categorize preadmission variables as high, medium, and low importance in selecting students[16,17]. Those information sources that were of high importance in both of these reports were total undergraduate grade-point average; grade point average in biology, chemistry, physics, and math; ratings from medical school interviews; involvement in and the nature of non health-related extracurricular activities; and MCAT scores. Additional high importance sources in 1986 included the quality of the degree-granting institution, involvement in and the quality of health-related work experience, state of residence, and breadth and difficulty of undergraduate course work. The only other information sources considered important in 1993 were knowledge of health care issues and commitment to health care.

METHODS

Study Design

This study was primarily descriptive and incorporated a survey comparing the 1997 academic year admission procedures with those anticipated for 2000. The survey included the demographic variables program format (number of years of pre-pharmacy), most recent ACPE accreditation visit, as well as questions related to respondents' perceptions that programs are already following the newly adopted ACPE 16.3 guideline, importance of each information source (e.g. grade point average, PCAT, interview, etc), and the importance of characteristics and which information sources are used to assess those characteristics.

Data Collection and Sampling

An author-constructed survey was developed using a medical school admissions survey for guidance of format[16]. The survey consisted of a two-page, front to back, fifteen item questionnaire. This questionnaire and a cover letter were sent to the person identified by each institution when contacted by the researchers. The cover letter and questionnaire were mailed December 10, 1997 with e-mail and phone follow-ups continuing until Feb. 21, 1998.

In an attempt to indicate the importance of this survey to the professional educational environment and increase the response rate, the cover letter informed respondents of the dual sponsorship of the study by AACP and ACPE, both national pharmacy education organizations. The cover letter also informed respondents of the anonymity of the survey in the event that answers would be influenced by the survey sponsorship. Neither the cover letter nor the questionnaire included the ACPE standards.

Table I. Correlations of selected instrument questions

Variable pair	Correlation
Interview 1997 - Oral Communication Skills 1997	0.469*
Interview 2000 - Oral Communication Skills 2000	0.471*
Essay 1997 - Written Communication Skills	0.177
Essay 2000 - Written Communication Skills	0.204
Organizational Leadership 1997 - Leadership Skills 1997	0.397*
Organizational Leadership 2000 - Leadership Skills 2000	0.402*
Volunteer Work 1997- Service Orientation 1997	0.276*
Volunteer Work 1997-Service Orientation 2000	0.244

*$P < 0.05$.

Content validity was enhanced by evaluation and pilot testing with representatives from the American Pharmaceutical Association (APhA) and the ACPE and a sample of admission committee representatives from five pharmacy programs. In addition, the AACP Institutional Research Committee, composed of research staff and institutional members, assessed the survey. Following feedback from these individuals, changes were made to the survey prior to its dissemination to the rest of the pharmacy school population who admitted pharmacy students for the fall of 1997(1).

Most of the survey questions were formatted into a chart with columns for current and future practices. The directions for each question listed the action the respondent should follow, such as "check the information source used, circle the importance of this quality, or list the source utilized." When asked to rate importance, responders were provided a five-point Likert scale ranging from 1 being "no importance" to 5 for "high importance." While the admission practices currently contained within the literature were listed in this survey, it was recognized that a great deal of diversity likely existed. Because of this possibility, many of the questions included space for 'other' responses and alternative descriptions. Likewise, respondents were provided space at the end of the survey to provide comments regarding admission practices and procedures which were not specifically addressed in the survey questions.

Data Analysis

To determine the difference between the current and future use of academic and nonacademic information sources by colleges of pharmacy (research Question 1), an academic/nonacademic index score was determined. This was calculated by subtracting the total weight of the academic score from the nonacademic source's weighted score. For example, if the respondent stated that the GPA had an importance score of 5 and the PC AT had a score of 3, the academic score was 8. If the interview score was 5 and the essay score was 2, the nonacademic score was 7. In this case, the academic/nonacademic index score was a −1. Thus, an academic/nonacademic index score that was more negative for the Fall 2000 compared to Fall 1997 indicated an increase in the importance of academic sources. Likewise, a change in the positive indicated an increase in the importance of nonacademic sources.

Principal component factor analysis was completed on the information source variables to determine which sources grouped together. The factor analysis loadings were considered significant if the value was $> 0.30(20)$. Table I lists the results of the factor analysis. Factor 1, termed PCAT, included the

PCAT subscores. Factor 2, qualities, included pre-pharmacy cumulative GPA, interview, essay, organizational leadership, volunteer work, and previous degree. Factor 3, foreign language tests included TOEFL, Test of Spoken English (TSE), and a negative correlation to interview. Factor 4, pre-college factors, included high school GPA, other exams (ACT/SAT), and other extracurricular activities, and TSE had a significant negative correlation. Factor 5, Pre-pharmacy GPA, included pre-pharmacy cumulative, science, and required grade points. Factor 6, Recommendations, included essay, personal, and professional recommendations.

Research Question 2 addressed the significant difference between the nonacademic qualities that pharmacy schools currently assess in applicants and the nonacademic qualities they expect to assess in the future. This question was answered by adding each characteristic's (*e.g.*, character and integrity, ethics, service orientation, etc.) weight together, which created a total score for each program's current and future assessment. The quality score was calculated by summing the total number importance values of individual qualities.

Research Question 3 questioned the current vs. future information sources used to assess the nonacademic qualities. This question utilized the compilation of a score for each of the information sources. Each information source score was calculated by summing the number of characteristics evaluated by that information source.

Data collected from the surveys were analyzed through descriptive statistics and t-tests using Statview 5.0®. The level for statistical significance was predetermined at $P<0.05$ and was adjusted using the Bonferroni technique when multiple tests were performed.

Reliability Measures

A number of questions were compared to assure the reliability of the instrument. These included the following pairs of questions and their correlations:

- interview importance with an oral communication skills quality;
- essay importance with a written communication skills quality;
- organizational leadership importance with leadership quality;
- volunteer work importance with a service orientation quality.

Table II demonstrates the correlations of these various reliability tests as well as the significance of the correlation. More than half of these four variable pairs had significant correlations for the 1997 and/or 2000 academic years.

RESULTS

Seventy-eight colleges of pharmacy were surveyed using the author-constructed instrument. Sixty-four of those schools were expected to offer entry-level PharmD programs according to AACP data(2). However, four of the 64 schools sent back their survey indicating that they did not admit entry-level PharmD students for Fall 1997. Fifty-five of the 60 remaining schools with entry-level PharmD programs completed the survey for a response rate of 92 percent.

The number of public institutions that responded was 37 out of 40 (90 percent) while the number of private institutions was 18 out of 20 (95 percent). Descriptive data included pro-

Table II. Factor loadings of 1997 information sources

Information source	Factors					
	PCAT	Qualities	FL Tests	Pre-College	PP GPA	Rec.
High School GPA	-0.085	0.117	0.006	0.616	-0.178	-0.005
Pre-phar Cumulative GPA	-0.003	0.422	-0.114	-0.200	0.438	0.018
Pre-phar Science GPA	0.049	0.187	0.043	-0.068	0.711	-0.046
Pre-phar Req. Course GPA	0.126	-0.125	-0.055	0.002	0.695	0.127
PCAT Verbal	0.869	-0.048	0.035	0.017	0.086	-0.065
PCAT Biology	0.887	0.059	0.038	-0.026	-0.029	-0.018
PCAT Reasoning	0.899	-0.040	0.045	0.034	0.079	0-009
PCAT Quantitative	0.897	-0.033	0.029	0.051	0.097	0-.007
PCAT Chemistry	0.908	0.001	-0.032	-0.012	-0.009	0.019
PCAT Composite	0.799	-0.013	-0.091	-0.082	-0.145	0.008
TOEFL	0.157	0.198	0.746	0.177	-0.104	-0.058
TSE	0.056	0.137	0.621	-0.398	-0.211	0.200
Interview	0.235	0.320	-0.702	-0.178	-0.257	0.125
Essay	-0.136	0.374	0.164	-0.208	-0.114	0.330
Personal recommendations	-0.159	0.263	-0.071	0.091	0.040	0.578
Professional recommendations	0.048	-0.045	-0.028	0.096	0.125	0.811
Leadership	0.001	0.871	-0.026	0.157	0.035	-0.046
Volunteer work	-0.063	0.865	-0.010	0.072	0.031	-0.030
Previous degree	0.010	0.351	0.232	-0.315	0.115	0.144
Other exams	0.155	2.64 E-4	0.106	0.636	0.024	-0.187
Other extracurricular activities	0.100	-0.040	-0.002	0.726	-2.88 E-4	0.301

Factor 1 = PCAT
Factor 2 = Nonacademic Qualities
Factor 3 = Foreign Language
Factor 4 = Pre-college
Factor 5 = Pre-pharmacy
Factor 6 = Recommendations

Table III. Program format of respondents and the population

	Respondents	Population	Percent of population
No Pre-pharmacy (0-4, 0-6, 0-7)	7	8	88
One Year Pre-pharmacy (1-5)	2	2	100
Two Years Pre-pharmacy (2-4)	44	48	92
Track-in after 4 years (4-2)	2	2	100

gram format (number of years of pre-pharmacy), most recent ACPE accreditation visit, respondents' perceptions that programs are already following the newly adopted ACPE 16.3 guideline and utilization frequency of each information source (e.g., grade point average, PCAT, interview, etc). As shown in Table III, the response rate from each of the program format (number of years of pre-pharmacy) categories varied from 88-100 percent.

All of the responding institutions have had an ACPE accreditation visit in the past seven years. Sixty-four percent (n=55) of the programs were visited since the beginning of 1995. Eighty-two percent (n=51) of the institutions believe that they are already following the newly adopted ACPE 16.3 guideline. Four of the schools were not aware of the standards, while five of the institutions were in the process of making changes to meet the standards.

The reliability data for the instrument demonstrated several significant correlations. While these values were significant, a high correlation did not exist. This is likely due to the many ways to measure these qualities other than the four information sources noted above. Likewise, these information sources may assess other qualities besides those used in this correlation analysis. The significant inter-item correlations provide evidence of some internal consistency which is appropriate for the first time use of this author-constructed instrument. General

Table IV. Number of institutions (%) utilizing each information source in the admission process

Information source	Current (%)	Future (%)
Organizational leadership	51 (93)	51 (93)
Volunteer work	51 (93)	51 (93)
Essay	48 (87)	48 (87)
Interview	47 (85)	48 (87)
Pre-pharm cumulative GPA	46 (84)	47 (86)
Pre-pharm required GPA	45 (82)	47 (86)
Pre-pharm science GPA	44 (80)	46 (84)
Professional recommendations	44 (80)	45 (82)
Personal recommendations	42 (76)	42 (76)
Previous Degree	37 (67)	40 (73)
TOEFL	39 (71)	40 (73)
Verbal PCAT score	30 (55)	34 (62)
Biology PCAT score	29 (53)	33 (60)
Chemistry PCAT score	29 (53)	33 (60)
Quantitative Ability PCAT score	29 (53)	33 (60)
Reading Comprehension PCAT score	29 (53)	33 (60)
Composite PCAT score	29 (53)	32 (58)
TSE	16 (29)	18 (33)
High School GPA	15 (27)	15 (27)
Other Exams (ACT, SAT)	13 (24)	14 (25)
Other Extracurricular activities (work)	11 (20)	11 (20)

reliability comments or additional reliability data on the instrument are not provided since the literature review did not indicate additional pairings.

Current Information Sources vs. Expected Future Information Sources

As seen in Table IV, the highest utilized information sources for the reported admission information sources (current, future) are organizational leadership (93 percent, 93 percent), volunteer work (93 percent. 93 percent), essay (87 per-

Table V. Statistics of 1997 and 2000 nonacademic and academic information scores

Information source index score	Mean	SD	t	P
1997 Qual/Quan Index Score	-11.67	12.02	1.488	0.1425
2000 Qual/Quan Index Score	-13.13	12.14		

Importance of information sources	1997		2000			
	Mean	SD	Mean	SD	t	P
Academic Sources						
High school GPA	1.691	1.275	1.691	1.275	*	*
Pre-pharm cum. GPA	3.909	1.506	4.036	1.387	-1.630	0.1089
Pre-pharm science GPA	4.018	1.616	4.145	1.483	-1.547	0.1278
Pre-pharm required GPA	3.945	1.557	4.073	1.451	-1.630	0.1089
Verbal Ability PCAT	2.582	1.607	2.836	1.607	-1.784	0.0800
Biology PCAT	2.400	1.523	2.636	1.544	-1.989	0.0517
Reading Comprehension PCAT	2.636	1.544	2.618	1.661	-1.877	0.0659
Quantitative Ability PCAT	2.582	1.607	2.873	1.634	-1.877	0.0659
Chemistry PCAT	2.600	1.673	2.818	1.634	-1.692	0.0964
Composite PCAT	2.691	1.804	2.873	1.816	-1.150	0.2550
Other Exams (ACT, SAT)	1.636	1.310	1.673	1.320	-1.000	0.3218
TOEFL	3.200	1.671	3.273	1.649	-1.272	0.2088
TSE	1.764	1.347	1.891	1.423	-1.630	0.1089
Nonacademic Sources						
Interview	3.945	1.446	4.073	1.386	-1.847	0.0703
Essay	3.618	1.326	3.709	1.370	-1.936	0.0580
Personal recommendations	2.691	1.275	2.727	1.312	-0.814	0.4192
Professional recommendations	3.055	1.380	3.200	1.419	-1.737	0.0882
Organizational leadership	3.436	1.135	3.491	1.120	-1.765	0.0832
Volunteer work	3.364	1.095	3.455	1.068	-1.936	0.0580
Previous degree	2.236	1.122	2.491	1.230	-2.806**	0.0070
Other extracurricular activities (work)	1.655	1.635	1.509	1.103	0.782	0.4378

* Not enough data points to calculate *t*-value and *P*-value.

** Not significant at *P* <0.05 since adjusted with Bonferonni Technique.

cent), pre-pharmacy grade point averages (80, 86 percent), interview (85, 87 percent), and personal (76 percent) and professional (80 percent,82 percent) recommendations. Pre-pharmacy grade points were not used by 100 percent of the programs because this data included programs with and without pre-pharmacy programs.

Table V lists the descriptive and inferential statistics of the 1997 and 2000 academic/nonacademic index scores as well as each individual information source scores. The only "other" information sources included are the other exams and other extracurricular activities. For the "other exam" information source, nine PharmD programs listed ACT/SAT as an important information source. Previous work experience was listed by six programs for the "other extracurricular activities" information source.

There was not a significant difference in the overall academic and nonacademic information sources. The mean 1997 academic/nonacademic index score was –11.67 with a standard deviation of 12.02 while the mean 2000 academic/nonacademic index score was –13.13 with a standard deviation of 12.14.

While the academic/nonacademic index scores and most of the individual information sources did not demonstrate significant differences between current and future practices, the "previous degree" information source was significantly different between 1997 and 2000. However, when the Bonferroni technique (18) was used to adjust for the multiple t-tests performed, this information source was not significant.

The survey requested specific practices associated with grade point average, interview, essay, and recommendations. Admission practices that were the most common between

Table VI. Comparison of current and future characteristic scores

Characteristic score	Mean	SD	t	P
Current - 1997	50.317	16.279	-1.637	0.1097
Future - 2000	50.375	16.518		

schools for the fall 97 pharmacy admission procedures included the following:

- One third use a formula in the admission process.
- Grade point averages: The most common minimum grade point average for application and admission is 2.5; one third make adjustments in grade point average based on the caliber of the institution.
- Interviews: Approximately half ask the same questions of each interviewee; 30 percent interview every applicant; faculty are used by most programs on the interview team, followed by students and admissions personnel; 80 percent ask interviewees situational questions while 95 percent ask achievement oriented questions; over half allow the interviewers to have access to a portion or all of the applicant's file; 40 of 55 schools interview one applicant at a time and most programs interview the applicants once.
- Essay: 85 percent require an essay at the time of application, 60 percent require one at the time of the interview, and less than 10 percent require one at another point in time; 25 percent publicize their essay questions.
- References: More than 80 percent use a standard reference

Table VII. Comparisons of current and future individual characteristics

Characteristic score	1997		2000			
	Mean	SD	Mean	SD	t	p
Character	4.255	1.339	4.275	1.313	-1.000	0.3221
Ethics	4.216	1.346	4.235	1.320	-1.000	0.3221
Service Orientation	3.588	1.374	3.588	1.374		
Work Habits	3.500	1.460	3.520	1.460	-1.000	0.3222
Motivation	4.373	1.148	4.373	1.148		
Leadership Skills	3.784	1.254	3.784	1.254		
Empathy	3.686	1.378	3.706	1.375	-1.000	0.3221
Responsible	3.824	1.381	3.843	1.377	-1.000	0.3221
Problem-solving skills	3.920	1.455	3.920	1.455		
Interpersonal relations	3.843	1.475	3.824	1.479	1.000	0.3221
Written communication skills	4.096	1.272	4.096	1.272		
Oral communication skills	4.135	1.469	4.192	1.442	-1.352	0.1822
Maturity	3.667	1.492	3.686	1.503	-1.000	0.3221
Other skills	1.071	0.463	1.073	0.469		

Table VIII. Information source changes between current and future admission practices

Characteristic score	1997		2000			
	Mean	SD	Mean	SD	t	P
Interview	9.106	4.598	9.149	4.389	-0.237	0.8140
Essay	5.574	3.900	5.511	3.967	0.829	0.4112
Assessment instrument	2.064	3.053	2.064	3.032	0.00	0.00
References	7.766	4.900	7.809	4.950	-0.703	0.4854

$P < 0.05$

form; over 90 percent do not use oral references; over 70 percent use letters of reference; and 33 percent require a list of references.

None of the questions had significant changes between what was currently done in 1997 and what is anticipated to occur in the year 2000.

Importance of Current Nonacademic Qualities vs. Future Importance

The mean quality scores for 1997 and 2000 were computed and compared as shown in Table VI. The most important current and future qualities were motivation, character, ethics, oral communication skills, and written communication skills. A significant difference did not occur between the total quality score, indicating that a significant change is not expected in the overall qualities assessed during the admission process. Additional t-tests with an adjusted alpha level were completed on each quality to determine if any individual differences occurred. Significant differences did not occur in the importance of any of the qualities between the current practices and those anticipated in the future (Table VII).

Current vs. Future Use of Information Sources to Assess Nonacademic Qualities

An interview followed by references were the most frequently chosen information sources to assess the nonacademic qualities addressed in the third research question. Paired t-test analysis was performed on each of the information source scores. Based on the f-test analysis, significant changes are not expected for the future (Table VIII). None of the programs indicated that any other information sources were used other than the four provided on the survey.

DISCUSSION

Information Sources Used

Current institutional admission practices appear to be in line with ACPE Guideline 16.3 which require that pharmacy programs use other information sources besides academic information(9). The ACPE standards require that schools utilize admission practices that measure nonacademic factors such as motivation, industry, and life-long learning. Most schools are utilizing nonacademic information sources such as interview, essay, recommendations, organizational leadership, and volunteer work to measure these nonacademic factors.

The information sources that were considered of above average importance (mean greater than 3.0) in this study were pre-pharmacy grade point averages (3.880-4.040), interview (3.920), essay (3.600), the TOEFL for applicants required to take it (3.180), organizational leadership (3.440), volunteer work (3.360), and professional recommendations (3.060). This study demonstrated similar results with medical school admission practices (Table IX) including grade point averages, standardized exam scores, recommendations, and interviews. This may indicate that consistency is occurring among the health professions.

The information sources that are frequently used together were determined through the factor analysis loadings. Most schools that utilized the PCAT scores used all of the subscores as well as the composite score. Since the PCAT subscores measure different aspects of the applicant, each one may be useful in the admission decision. Those institutions that used interview, essay, organizational leadership, volunteer work, and previous degree also tended to use the pre-pharmacy GPA. Institutions using the foreign language exams (TOEFL, TSE) were less likely to use interview, which provides evidence that programs use either the foreign language exams or the interview to assess communication qualities and skills. The pro-

Table IX. Comparison of medical and pharmacy school important information sources

Information source	Medical schools (1986)	(1993)	Pharmacy schools (1997)
Grade point average	Undergraduate cumulative, science	Undergraduate cumulative	Pre-pharmacy cumulative, required, science
Standardized scores	MCAT	MCAT	PCAT
Recommendations	Letters of evaluation	Letters of evaluation	Professional Recommendations
Interviews	Interview ratings	Interview ratings	Interview ratings
Essay	—	—	Essay scores
Extracurricular activities	Extracurricular activities	—	Organizational leadership skills
Work experience	Work in areas related to health care	—	Volunteer work
Other	Quality of prior institution	Knowledge of health care issues	—
	Breadth/depth of course work	Commitment to health care	
	State of legal residence		

Table X. Comparison of characteristics in the literature with those assessed by programs

Characteristic	Literature source	Importance Mean
Motivation to enter the profession	ACPE, 1997; Baker *et al*., 1993; Blaisdell & Gordon, 1979; Duncan-Hewitt, 1996; Hall &Bailey, 1992; Meredith *et al*., 1982; Powis *et al*, 1988	4.255-4.275
Character and integrity	McGaghie, 1990; Hall & Bailey, 1992	4.217
Ethics	Hansen & Pozehl, 1995; Meredith *et al*., 1982; Levine, *et al*., 1986	4.174
Oral and/or written communication skills	ACPE, 1997; Duncan-Hewitt, 1996; Hall & Bailey, 1992; Hansen & Pozehl, 1995; Levine *et al*., 1996	oral-4.135 written-4.096
Problem-solving skills	Duncan-Hewitt, 1996; Levine *et al*., 1986	3.920
Interpersonal relations	Hall & Bailey, 1992; McGaghie, 1990; Meredith *et al*., 1982	3.843
Responsible actions	Duncan-Hewitt, 1996; Levine *et al*., 1986	3.824
Leadership	Hall & Bailey, 1992; McGaghie, 1990	3.784
Supportive and encouraging behavior	Duncan-Hewitt, 1996; Powis *et al*., 1988	3.686
Maturity	Levine *et al*., 1986; Meredith *et al*., 1982	3.667
Service orientation	Duncan-Hewitt, 1996; McGaghie, 1990	3.588
Work habits	Levine *et al*., 1986; McGaghie, 1990	3.500

grams that used the high school grade point, other entrance exams such as ACT and SAT, and extracurricular activities were less likely to use the TSE or previous degree. Most programs without a pre-pharmacy program apparently use the TOEFL rather than the TSE and very few of the applicants would have a previous degree since most of these admitted students are entering directly out of high school. The programs that used essay were also likely to use both types of recommendations, personal and professional.

This study showed that the information source, previous degree, is expected to increase in importance in the future, however this change was not statistically significant, nor did this information source receive a high rating for importance. A Kawahara and Ethington report described the increased likelihood of success of pharmacy students who have previous degrees(21). It may be that as other health care professions become more like the medical profession, a four-year undergraduate degree will be required prior to entering a pharmacy program. This information source will need to be studied further before pharmacy programs rely on it as an important information source.

The use of formulas to adjust grade point averages has been described previously(12,22). The majority of pharmacy programs (67 percent) responding in this study do not use a ranking system of previous grade point average. Those schools that adjust grade point averages do so with the use of a formula or take into account where the pre-pharmacy program was completed. In addition, many schools (75 percent) utilize standardized tests like the PCAT and ACT/SAT which also provide a uniform measurement of cognitive abilities(23).

Several recommendations are provided in the literature to improve the validity and reliability of the interview. Several authors suggest structuring methods that include asking standardized questions(24), providing a panel of interviewers(25), using situational and achievement questions(26), and not providing the interviewers access to the applicant's file(14). More than half of the pharmacy programs in this study standardize their interview questions, provide a panel of interviewers, and use situational and achievement questions. Programs may want to reconsider the provision of the applicant's file to the interviewers since currently over half of the admission practices allow interviewers access to some or all of the parts.

It should also be noted that while a significant difference did not occur in the total or individual information sources, some institutions are making significant changes in their program's admission practices. For example, four programs plan to begin using the PCAT exam, two schools the foreign language exams, three programs will be considering a previous degree, and one program will begin using the interview. In addition, two programs will begin considering the required and science pre-pharmacy grade point averages for 2000. While these changes are not large enough to impact the overall data used in this study, they are likely a significant change for these individual programs.

Characteristics Sought and the Information Sources Used

All of the listed qualities on the survey were considered of above average importance in the admission process. The top five qualities were motivation to enter the profession (4.255-4.275), character (4.217), oral communication skills (4.135), ethics (4.174), and written communication skills (4.096). Very few respondents listed any additional qualities that are evaluat-

ed during the admission process. This indicates that those characteristics and skills recommended for assessment in multiple sources of the health professional literature are likely the same that are assessed during pharmacy admission processes. Table X reviews the quality, literature source documentation and average importance score from this study.

McGaghie opines that the interview is the best way to assess qualities(7). It appears from this study that pharmacy programs are following that recommendation. The interview was the most frequently used information source to determine the presence of affective qualities. The next frequently used were references and essay.

Minimal differences existed between the demographic variables institution type, program structure, ACPE accreditation visit, or applicant/admit/enroll ratios. One difference is that public institutions tend to assess pre-pharmacy science and required grade point averages more than private institutions.

Limitations

Following are the limitations that existed in this study and efforts taken to control them:

1. Some programs may have already made changes in admission practices. Therefore, this study may not detect changes if they occurred prior to the 1997 academic year. In addition, if programs felt that they were already meeting the standards they would not be planning significant changes. Therefore, a question was asked on the survey if schools were already in accordance with the standards that will go into effect for the entering class of the 2000 academic year.
2. A transition period may have been occurring for pharmacy schools which could have made it difficult for current practices to accurately reflect the admission procedures. Therefore, current data was collected along with the future presumed practices. The academic year 2000 was used in the survey with the intention that it would be far enough into the future to detect trends but yet a short enough future time period for admission procedures to be accurately predicted.
3. Admission committee chairs may have answered with their perceptions of future practices rather than what will actually occur at their institution. This limitation was addressed by realizing that the current information source importance ratings were also the individual respondents' perceptions. Thus, it was determined that consistency was likely to occur among the current and future responses.
4. Due to the survey sponsorship, admission committee chairs may have completed the questions with preferred responses rather than actual practices. This limitation was attempted to be controlled by providing coded surveys for follow-up only. In addition, respondents were assured in the cover letter that data would only be reported in the aggregate.
5. This study's survey was a lengthy instrument so the possibility of fatigue, bias, and other threats to validity were possible. To guard against this, the questions were framed in yes/no, Likert scale, and check-off format. The pilot group reported that the survey took approximately 30 minutes to complete. This time frame was deemed acceptable for a survey of this nature.
6. Since this survey was author-constructed, issues of validity were present. Therefore, a pilot group was used to enhance the content validity. In addition, construct validity was evaluated using the survey responses and the question asking respondents if their institution was meeting the new accreditation standards.
7. Statistical limitations were present because of the low sample size and possibility of Type I errors. Thus, ANOVA tests could not be used with all of the demographic variables. To control the Type I error possibility, adjustments were made in the alpha level when multiple statistical tests were used.

Conclusions and Implications for Practice

The following conclusions are drawn from this study of admission practices in admission programs:

• Current practices are not expected to change significantly in the future. Thus, current practices and future expectations indicate that nonacademic information sources are utilized by colleges of pharmacy along with academic sources.
• Affective qualities and information sources documented in the health care profession literature are those sought and used in the admission process.
• Most pharmacy programs (82 percent) believe they are meeting the adopted ACPE Guideline 16.3 which focus on admission practices.

This study supports much of the literature regarding admission practices in the health care profession. When comparing pharmacy program admission practices with other health care professional programs as documented in the literature, a number of similarities occurred. For example, the majority of programs in all of the health care professions appear to admit applicants based on multiple information sources. Furthermore, several similarities are present in those information sources. It is recommended that admission standards be used which will admit those individuals who have the potential to provide pharmaceutical care (8). If programs are using nonacademic information sources and assessing qualities to the degree of importance as indicated on this survey, this recommendation is being met. Thus, this study confirms that pharmacy education is attempting to advance pharmaceutical care.

This study did not indicate the occurrence of any significant changes before the Fall 2000 admission process is implemented. Yet, this may not signal a need for concern. Since the majority of the institutions assess candidates both academically and nonacademically, it appears that the accreditation standard is being met. This may have practical significance for the profession as it considers the way in which future practitioners are admitted into the professional programs.

This study focused on the use of information sources and indicated that pharmacy programs have implemented processes that consider academic and nonacademic aspects of the applicants. But, the effectiveness of those practices in determining admission of students who will be most likely to be the most successful as students and as practitioners was not studied or reported. Thus, another important area for study regarding admission practices includes assessment of admission practices to identify if pharmacy programs are using admission sources appropriately and admitting the applicants that will be the most successful.

Some respondents stated that they were not expecting admission practice changes between the current 1997 and

future 2000 entering students admitted into entry-level PharmD programs. However, some did note that definite decisions on admission practices were not made until one year in advance of the admission process.

Some of the suggestions from the literature review that were not covered in this study but may be important for pharmacy schools to research and consider in their admission processes include the importance of training interviewers and evaluators of applications, essays, and other written exercises. Since such a large emphasis is being placed on the interview, adequate training would help assure continuity and validity of information.

This survey was completed by programs with entry-level PharmD programs. Those continuing to offer the BS degree may not currently assess applicants using nonacademic sources. Therefore, it may be speculated that when an institution implements an entry-level PharmD program and embarks upon curricular reform, admissions procedure changes are also implemented.

The majority of program respondents felt that their institution was already meeting the accreditation standards on this topic. It appears that overall, programs are demonstrating the ACPE Guideline 16.3 as determined by the high number of programs utilizing interviews, essays, recommendations, previous degree, organizational leadership, and volunteer work. This is an indication that the adoption of these standards was appropriate due to pharmacy school's response in implementing those standards. However, the possibility exists that the standards are not being completed at the level that the accrediting agency chooses them to be. Thus, each program will need to be assessed on an individual basis through accreditation self-study and visit processes. Pharmacy programs are also encouraged to evaluate these practices to assure that the best candidates are entering the pharmacy profession.

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