Evaluating Curricular Outcomes by Use of a Longitudinal Alumni Survey: Influence of Gender and Residency Training

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This paper reports the results of a survey designed to determine preparation for practice, career outcomes, professional contributions, and job satisfaction of graduates of an entry-level PharmD program, emphasizing the influence of gender and postgraduate residency (PR) training on these. In 1988, a survey was mailed to 1,518 graduates in the classes of 1970-1986; 1,044 (69 percent) responded. Of these, 583 (56 percent) were men, 461 (44 percent) were women; 481 (46 percent) had pursued some type of advanced postgraduate training; and 392 (38 percent) completed residencies. Of the 93 percent who remained in practice, 91 percent were working full time; 65 percent were in hospital practice and 21 percent practiced in community pharmacies. The results reaffirm the strong and positive influence of residency training on professional outcomes, particularly for women. Residency was a much stronger predictor of differences in salary, practice patterns, job satisfaction, professional contributions, and hours worked per week than was gender. Despite a clinical emphasis in our curriculum, the primary career path led to management. These findings have challenged our faculty to review and enhance the pharmacy administration offerings in our curriculum and to consider educational strategies that will better prepare and motivate our students to pursue careers in ambulatory and intermediate health care settings.

INTRODUCTION

Over the past quarter century, major shifts have occurred in pharmacy education and practice. In 1992, the American Association of Colleges of Pharmacy voted to support the Doctor of Pharmacy (PharmD) degree as the sole entry-level degree for pharmacy(1), an action that came after many other professional organizations (among them ASHP, APhA, and ASCP) had endorsed this position(2). Within the practice, there has been widespread adoption of pharmaceutical care as a mission for the profession (2). Although the concept of pharmaceutical care is still evolving, most definitions invoke a practice in which pharmacists take an active role on behalf of their patients and assume direct responsibilities for desired patient outcomes. As pharmacy has advanced, there has been a greater need for practitioners with increasingly sophisticated skills and knowledge.

As many schools now turn their attention to curricular revision for the purpose of better preparing their graduates to deliver pharmaceutical care, there will be a need to assess the impact of curricular changes on graduate outcomes. These results can be valuable to faculty who are striving to continually improve the educational process. Traditionally, curricular outcomes have been based on student performance in various courses, cumulative examinations, and ultimately, pass rates of graduates on licensure examinations. Some schools have begun to turn to graduate surveys as yet another tool to assess curricular outcomes in terms of their graduates' career choices, job activities, job satisfaction, and contributions to the profession. Graduates' perceptions of how well the curriculum prepared them for practice and an analysis of their practice patterns can also be used to influence curricular revision.

For two accreditation cycles, the University of California at San Francisco (UCSF) School of Pharmacy has used an alumni survey to augment its self-study. In 1982, a survey was conducted of those who had graduated from the entry-level PharmD program between 1970-1981(3). The purpose of that survey was to assess the outcomes of the clinical curriculum, which had been established in 1970.² UCSF has offered the PharmD degree as the sole degree since 1955; however, the curriculum underwent a major revision in 1970 and has since remained relatively stable (4).

In a separate analysis of the 1982 survey, it was found that those who had completed postgraduate training were more likely to practice in a clinical pharmacy setting, contribute to the professional literature and be actively involved in professional organizations than those who had not completed postgraduate work(5). Postgraduates were also more satisfied with their careers. Gender—not postgraduate status was the major determinant of annual changes in salary and movement into management positions. Annual increments in salary were greater for males than they were for females and males were more likely to hold management positions than were females.

In 1988, all individuals who had graduated from our program from 1970 through 1986 were re-surveyed for two reasons. First, we wanted to reassess the graduate outcomes of our curriculum in preparation for an accreditation review. Second, we were experiencing the same gender shifts that had been observed nationally² and wanted to determine if this would influence the graduate outcomes of a fairly stable clinical curriculum. Specifically, the number of women gradu-

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² Over the past 20 years, our curriculum has emphasized both the basic and clinical sciences. A fourth professional year in clinical settings includes training in communications skills, drug information retrieval and analysis, problem solving and clinical practice(4).
From UCSF had increased an average of 4.6 percent annually from 28 percent in the class of 1970 to 56 percent in the class of 1986. Our latest enrollment statistics show an even more dramatic trend in the rapidly increasing ratio of female to male UCSF-trained pharmacists: 73 percent of our current students are women; and significantly, the percent of women comprising our entering first-year students peaked to 78 percent in September 1991. At the time of the first survey, when the majority of our female graduates were just beginning their careers, it was observed that they were just as likely to pursue postgraduate training as were men. Since a large fraction of our graduates (>40 percent) continued to pursue postgraduate training over the years, we were anxious to see if the positive professional effects of postgraduate training could be sustained and thus minimize the effect of gender on salaries.

The 1988 survey was modeled on the 1982 survey which was designed to determine the graduates’ evaluation of the curriculum, practice patterns, professional activities, salaries, attitudes toward the profession, postgraduate training, job satisfaction and demographic characteristics. However, the latter survey was expanded to retrieve information on career leaves and part-time employment patterns. The purpose of this article is to provide an overview of the results of this survey. Specifically, we are reporting the career outcomes, professional contributions, and job satisfaction of our graduates, emphasizing the influence of gender and postgraduate residency training on these.

METHODOLOGY

A survey with 49 questions was developed with all but two being quantitative in design. Opinion statements included ordinal scales to measure strength of response. From 1970 through 1986, 1,584 individuals received the PharmD degree from UCSF; of these, accurate addresses were identified for 1,518 or 96 percent. Three mailings were sent to these individuals between August and October 1988 (the survey, a reminder, and a second survey if there was no response). The survey and our methodology were reviewed and approved by the UCSF Human Subjects Review Committee and the anonymity of each respondent was rigorously maintained.

Data were analyzed in the aggregate and stratified by gender, residency, and a combination of both. A mainframe SAS package (Version 6, SAS Institute, Cary NC, 1985) was used for statistical analyses where appropriate. Salary data were analyzed by least squares regression of annual income with respect to years of experience. For this purpose, four categories of respondents were identified by sorting the data initially by gender and then by graduates who did or did not elect residency training. Prior to the regression, a log transformation of income was employed to correct for a positive skewness discovered during exploratory data analyses. The output was placed in an exponential form in order to return the data to the original units (dollars) and plotted together for direct comparisons. Significant differences among these “best fit” lines were tested using contrast analyses (provided by SAS and analogous to a least significant difference test following ANOVA). Analysis of covariance, with years of experience treated as a covariate, was used to describe the influence of gender and/or residency as a multiplicative effect on annual income per years of experience.

The effects of gender and residency training on the percentage of time devoted to each of four job components (administrative, operational, clinical and teaching) were studied using repeated measure analysis of variance. For this purpose, a model was written using the job component heading to represent repeated measurements of time devoted to each of these tasks. Gender and residency training were treated as grouping factors (between subjects) and the four job components as a within subject factor. Inasmuch as univariate (Huynh-Feldt) and MANOVA analyses agreed on which effects were significant, only the repeated measures results were further explored. Post hoc analyses to compare the non-operational components (administrative, clinical and teaching) with the operational category were performed using a contrast decomposition.

The issue “overtime” work was approached by using exploratory data analysis (EDA) and logistic regression. Using only those respondents who indicated full time employment, EDA uncovered a reasonable breakpoint for the definition of overtime (45 hours or more per week). A logistic regression model was written with overtime as the dependent (binary) variable expressed as a function of job title, gender and/or residency training.

Job satisfaction (as measured on a five-point Likert scale) was analyzed using rank ANOVA. This procedure requires a rank transformation of the data followed by F tests on the transformed results.

P-values for all other relationships were provided by using either chi-square or Mann-Whitney tests for differences between groups. A threshold for significance was set at P < 0.05.

RESULTS

Response Rate

Of the 1,518 graduates surveyed, 1,044 (69 percent) responded. Consistently, 69 percent of each class responded to the survey.

Demographic Information

Gender and Ethnicity. Of the 1,044 respondents, 583 (56 percent) were men and 461 (44 percent) were women. This closely corresponds to actual demographics of the survey population, 54 percent men and 46 percent women. The increasing number of women entering pharmacy is reflected in the survey responses when analyzed by both graduation year and sex: while only 30 percent of the respondents who graduated in 1970 were women, 62 percent of the 1986 respondent class were women. The ethnic breakdown of survey respondents was 55 percent Caucasian, 36 percent Asian, four percent Hispanic and three percent African-American; the remaining two percent were composed of Filipinos, Native Americans, and other nonwhites.

Marital and Parental Status and Age. At graduation, 37 percent of men and 28 percent of women were married; one percent of men and 0.6 percent of women were separated or divorced. By 1988, 75 percent of men and 67 percent of women were married; 3.5 percent in each group were separated or divorced. At graduation, 19 percent of men and five percent of women had children. In 1988, about two-thirds of

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3 Since the late sixties and early seventies, the number of women graduating from schools of pharmacy has increased dramatically. Women represented 50 percent of graduates in 1984 and 62 percent of the graduates in 1991 (6). In the mid-1970s women comprised slightly more than 10 percent of the active workforce and in 1988, they comprised approximately one-quarter of practicing pharmacists. This fraction is projected to increase to almost 40 percent by the end of the century (7).
men (67 percent) and one-half of women (47 percent) reported they were parents. At the time of the survey, the mean age for men was, on average, 1.5 years greater than their female colleagues for each graduation year except for the class of 1986, whose mean age for both men and women was equal. In 1988, the mean ages of women in the classes of 1986 and 1970 were 29 years and 42 years, respectively.

Pre-pharmacy Education. Graduates completed an overall average of 3.4 years of pre-pharmacy education with a range of two to nine years. Over time, there has been a trend toward more years of pre-pharmacy education. More women than men completed only two years of pre-pharmacy education (38 vs 26 percent), whereas more men than women completed five or more years (18 vs 11 percent).

Postgraduate Education and Training. Of those who responded to the survey, 46 percent completed or were in the process of completing some type of advanced training (Table I). Overall, 38 percent had completed or were completing hospital, clinical or specialty pharmacy residencies (PRs). The percent of graduates who pursued residency training generally increased over time, from a low of 12 percent in 1971 to a high of 53 percent in 1986. Among the postgraduates, the breakdown in gender was proportional to that of survey respondents as a whole (47 percent of men and 45 percent of women). The ethnicity of this group did not parallel the demographics of our survey population, however, an observation we also made in our 1982 survey(5). A disproportionately higher percentage of Caucasians and a correspondingly lower percentage of Asians had completed or were in the process of completing residencies. Representation among other minority groups, including African Americans and Hispanics, was proportional to that of all respondents.

Preparation for Practice
Graduates were asked to rate their education and training. Overall, 79 percent rated their preparation for practice excellent (22 percent) or above average (57 percent). Male PRs were most likely to agree that their education prepared them for practice (91 percent) and females who did not complete a residency (NPRs) were least likely to agree (68 percent); 81 percent of female PRs and male NPRs rated their preparation for practice as excellent or above average.

Practice Patterns
Graduates were asked to respond to a series of questions about their practice settings and positions, job activi-

<table>
<thead>
<tr>
<th>Type</th>
<th>n^a</th>
<th>Percent^b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital/Clinical residency()</td>
<td>377</td>
<td>78.4</td>
</tr>
<tr>
<td>Specialized residency()</td>
<td>54</td>
<td>11.2</td>
</tr>
<tr>
<td>MBA</td>
<td>40</td>
<td>8.3</td>
</tr>
<tr>
<td>Fellowship</td>
<td>37</td>
<td>7.7</td>
</tr>
<tr>
<td>MD</td>
<td>23</td>
<td>4.8</td>
</tr>
<tr>
<td>MS or MPH</td>
<td>18</td>
<td>3.7</td>
</tr>
<tr>
<td>PhD or equivalent</td>
<td>17</td>
<td>3.5</td>
</tr>
<tr>
<td>Other</td>
<td>55</td>
<td>11.4</td>
</tr>
</tbody>
</table>

^a Individuals may have selected more than one response.
^b Percent of those who pursued postgraduate education.

Fig. 1. Practice settings of respondents by first and current position. Hosp = hospital pharmacy, Comm = community pharmacy, Clinics = clinic or ambulatory setting, SNF = nursing home, Industry = pharmaceutical industry, Other = home care, consulting, drug/poison information, combination of settings, or other settings.
Table II. Numbers of practitioners holding various payroll titles in first and current positions (N=802)a,b

<table>
<thead>
<tr>
<th>Current payroll title (n)</th>
<th>Director</th>
<th>Assoc./Asst. Director</th>
<th>Manager/Supervisor</th>
<th>Staff</th>
<th>Clinical/Specialist</th>
<th>Faculty</th>
<th>Owner</th>
<th>Combo c</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>First payroll title</td>
<td>(91)</td>
<td>(68)</td>
<td>(84)</td>
<td>(299)</td>
<td>(108)</td>
<td>(36)</td>
<td>(36)</td>
<td>(27)</td>
<td>(53)</td>
</tr>
<tr>
<td>Director</td>
<td>(22)</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>11</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Assoc./Asst. Director</td>
<td>(14)</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Manager/Supervisor</td>
<td>(32)</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>10</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Staff</td>
<td>(531)</td>
<td>58</td>
<td>37</td>
<td>58</td>
<td>248</td>
<td>61</td>
<td>9</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td>Clinical/Specialist</td>
<td>(117)</td>
<td>16</td>
<td>15</td>
<td>17</td>
<td>17</td>
<td>29</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Faculty</td>
<td>(41)</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>16</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Owner</td>
<td>(3)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Combination</td>
<td>(21)</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>(21)</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

`a Numbers in parenthesis indicate total numbers of practitioners holding the title initially (horizontal lines) and currently (vertical lines).`

`b Example: of 531 practitioners who held a “Staff Pharmacist” payroll title in their first jobs, 248 still have this title; 58 now hold “Director” titles and 61 hold “Clinical Pharmacist” or “Specialist” titles.`

`c Individuals who hold more than one payroll title`
percent of respondents reporting a managerial component nearly doubled from 32 percent to 59 percent from first to current job, as did the mean percent time spent in this activity (22 percent to 41 percent).

Table IV contrasts the mean percent time currently spent in these four job components by gender and residency. The results parallel our findings with regard to position title. A higher percent of men than women were involved in management activities and they spent a greater percent of their time than did women involved in this job component. The same was true for women with regard to operational activities. PRs were more likely to spend time in clinical and teaching activities than NPRs. Approximately 80 percent of PRs spent over one-third of their time involved in clinical activities. This is in contrast to about two-thirds of NPRs who were clinically involved about one-quarter of their time. Similarly, almost twice as many PRs than NPRs indicated teaching as a job component. NPRs were more likely than PRs to spend a greater percent of their time involved in operational activities.

Analysis of the above data by ANOVA using a repeated measure design allowed us to assign all respondents a value in all job components (even if it was zero) and analyze them statistically. When the mean percent time spent in each of the components was compared to that spent in operations, there were significant differences. The amount of time men spent in management and teaching compared to operational activities was significantly greater than that for women (P = 0.003 and 0.02, respectively). The amount of time spent by PRs in all three components relative to the operational component was significantly greater than that for NPRs (P = 0.001 for each).

Hours Worked in Current Position. Overall, 91 percent of those currently in practice were working full time (35 or more hours weekly). Men were more likely than women to work full time (97 vs 82 percent) and PRs were more likely to work full time than NPRs (96 vs 87 percent). However, when these data were stratified by both gender and residency, residency training was a stronger determinant of hours worked per week for women. Of female PRs, 92 percent work full time versus 74 percent of female NPRs. For men, residency training had little or no effect on the percent who worked full time (99 percent for male PRs vs 97 percent for male NPRs). See Figure 2.

Table IV. Job component in current position: Overall by gender and residency status

<table>
<thead>
<tr>
<th></th>
<th>Overall</th>
<th>Gender</th>
<th>Residency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group</td>
<td>Time</td>
<td>Group</td>
</tr>
<tr>
<td></td>
<td>n=923</td>
<td>Time</td>
<td>n=348</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>n=508</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>n=415</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>n=375</td>
</tr>
<tr>
<td>Managerial</td>
<td>58.6</td>
<td>41.0</td>
<td>60.9</td>
</tr>
<tr>
<td>Operational</td>
<td>80.3</td>
<td>59.2</td>
<td>65.5</td>
</tr>
<tr>
<td>Clinical</td>
<td>71.5</td>
<td>29.3</td>
<td>82.8</td>
</tr>
<tr>
<td>Teaching</td>
<td>45.5</td>
<td>15.1</td>
<td>61.2</td>
</tr>
</tbody>
</table>

Analysis of the above data by ANOVA using a repeated measure design allowed us to assign all respondents a value in all job components (even if it was zero) and analyze them statistically. When the mean percent time spent in each of the components was compared to that spent in operations, there were significant differences. The amount of time men spent in management and teaching compared to operational activities was significantly greater than that for women (P = 0.003 and 0.02, respectively). The amount of time spent by PRs in all three components relative to the operational component was significantly greater than that for NPRs (P = 0.001 for each).

Exploratory data analysis demonstrated that full time practitioners could be divided into groups that did or did not perform overtime work (45 or more hours per week) on a regular basis. Further analyses indicated that gender had no value as a predictor of overtime work (P = 0.57) whereas residency training and job title had strong effects (P < 0.0001 for both).

Career Leaves and Part-Time Work Histories. Graduates responded to a series of questions related to career leaves of absence and part-time work. Career leaves were defined as a leave of six months or more engaged in activities unrelated to the practice of pharmacy, excluding residencies and fellowships. Part-time work was defined as working 34 or less hours per week for six months or longer. Overall, 15 percent of respondents took a leave of absence at some time during their career for a mean of 28 months (range 6-156 months). Females were twice as likely as males to take a leave (23 vs 11 percent); but, interestingly, the duration of their leaves was shorter than those of males (mean: 24 vs 37 months). PRs were less likely to take a leave than NPRs (12 vs 19 percent). Of all respondents, 22 percent indicated they had worked part time during their career and nine percent of active practitioners were working part time at the time of the
survey. Women were more likely than men to have worked part time at some time during their careers (34 vs 14 percent) and PRs were less likely to have worked part time than NPRs (13 vs 29 percent). On average, women worked part time longer than men (mean: 45 vs 30 months).

**Salary.** Our graduates reported their gross annual salary before taxes and other deductions. Separately, they reported the percent time worked as well as the hours per week worked in their current position; all salaries reported as 100 percent time were analyzed. To minimize geographic salary variations, the analysis was restricted to graduates practicing in California. Mean salaries for each graduating class were stratified by gender, residency, and a combination of both. Figure 3 displays the increase in annual income per year of experience for full-time practitioners. Time, expressed in years since graduation, is a covariate of salary. ($P = 0.0001$). The multiplicative percent increase (slope of the line) for male and female PRs are 2.28 and 1.34 percent, respectively, while those for male and female NPRs are 0.95 and 0.73 percent, respectively. The rate of salary increase for male PRs was greater than those for both male and female NPRs ($P = 0.0007$ and 0.0004, respectively) and female PRs ($P = 0.068$). There were no significant differences in the annual rate of salary increase between male or female NPRs. The mean starting salaries for all groups were not significantly different. A similar analysis was performed for graduates with uninterrupted careers (i.e., those who had no history of working part time or taking a leave of absence) and found that the same relationships between annual salary increases held for all groups. However, the differences in annual salary increases between male and female PRs became less remarkable ($P = 0.17$).

**Graduates Who Left the Profession.** Of all respondents, 7.3 percent indicated they were no longer practicing pharmacy. This is down from the 8.5 percent we found in our 1982 survey(3). Of this group, men comprised 63 percent and women 37 percent; one-third of these men and one-quarter of these women had completed a residency. Of those who left, 29 percent were employed in another field, 28 percent were physicians, and 18 percent were homemakers or parents. Three-quarters (73 percent) of those who left practiced one or more years, with a mean of 6.1 years (range 1-15 years). The most common reasons cited for leaving practice were similar to those reported in our 1982 survey and included interest in another field (84 percent), lack of challenging of stimulating employment opportunities (69 percent), lack of respect from the public and other health professionals (52 percent), lack of financial reward (43 percent) and limited management opportunities (41 percent).

**Contributions to the Profession**
Graduates responded to a series of questions addressing membership and involvement in professional organizations, publication activities and teaching. A summary of these results follows:

**Professional Organizations.** Overall, 80 percent of all respondents were members of one or more professional organizations with a mean of 3.0 (range 1-9). Of those who belonged to organizations, the most frequently cited were the American Society of Hospital Pharmacists (67 percent), California Society of Hospital Pharmacists (59 percent), California Pharmacists Association (33 percent), American Pharmaceutical Association (20 percent), American College of Clinical Pharmacy (6 percent), American Association of Colleges of Pharmacy (5 percent) and American Society of Consultant Pharmacists (3 percent). Sixteen percent indicated they were members of “other” professional associations. Gender had no influence on membership in professional organizations. However, PRs belonged to significantly more organizations than did NPRs ($P = 0.01$).

One-third (34 percent) of all respondents reported that they had served in one or more elected or appointed positions at either the national, state or local levels. The percent of graduates elected to office at the national, state, and local levels were three, five, and 15 percent, respectively. Those serving in committee or appointed positions at the national, state and local levels were seven, 15, and 22 percent, respectively. When analyzed by gender and residency status using a Mann Whitney comparison, there were no gender differences, but PRs were more likely than NPRs to have held elected or appointed positions at all levels.

**Poster Presentations and Publication.** About one-half of all respondents (49 percent) indicated that they had published or had presented papers at professional meetings. About one third (36 percent) of respondents had presented one or more papers or posters at professional meetings (mean number = 5.6); 30 percent indicated they had authored original journal articles (mean number = 7.0); 29 percent had published articles in newsletters (mean number = 8.8); and 14 percent authored a mean of 3.5 book chapters. The total number of posters and papers published by PRs was significantly greater than that published by NPRs ($P = 0.0001$). Among PRs, men tended to publish more than women ($P = 0.06$). However, among NPRs, the total number of publications/posters presented by men was significantly greater than that of women ($P = 0.0008$).

**Teaching.** Of all respondents, 51 percent indicated they currently taught pharmacy or health-related subjects in a variety of settings. Over one-half of these trained pharmacy interns at their practice sites (59 percent), provided in-service programs (57 percent), and precepted externship or clerkship students in association with a school of pharmacy (54 percent). Continuing education programs for health
professionals were provided by 41 percent of those who indicated they were teachers. There were no gender differences among those who taught; however, PRs were far more likely to teach than were NPRs ($P = < 0.001$).

**Attitudes About Pharmacy and Job Satisfaction**

**General Attitudes Toward the Profession.** Overall, 94 percent of the graduates indicated they were “fairly” or “very” satisfied with life in general. Several questions explored our graduates’ general attitudes toward the profession. They were asked if they would choose pharmacy again if they were starting their careers over and if they would recommend pharmacy to a qualified friend. In response, 60 percent would probably or definitely select pharmacy again and 68 percent would probably or definitely recommend the profession. These responses are consistent with our findings in the 1982 survey (60 percent for both questions) (3). When these questions were stratified by gender and residency status, both male and female PRs were more likely to choose pharmacy again (68 percent and 70 percent, respectively) than were NPRs. Male NPRs were the least likely to select pharmacy again as a career (53 percent). There were no gender differences with regard to recommending the profession to a qualified friend; however, those who completed residencies were more likely to do so than those who had not (75 vs 64 percent).

Graduates were asked to rate several aspects of current pharmacy practice on a 1-4 scale in which “1” corresponded to “one of the worst things about pharmacy” and “4” corresponded to “one of the best things about pharmacy.” Geographic mobility (mean response 3.1) and the respect the public has for pharmacists (mean response 3.1) were rated as “a good” or “one of the best things” about pharmacy by 90 percent of the respondents. Seventy percent indicated the amount of money a pharmacist could earn was a good/best aspect of the profession (mean response 2.7), while 66 percent indicated that the opportunities to achieve managerial or professional status was a good/best aspect (mean response 2.7). About 75 percent of the respondents rated the amount of government regulation “a pretty bad” or “one of the worst things” about pharmacy (mean response 2.1). Sixty one percent considered the extent to which pharmacists can make independent decisions about health care, one of the most negative aspects about pharmacy (mean response 2.3).

**Job Satisfaction.** A five-point Likert Scale (1 = strongly disagree; 3 = neutral; 5 = strongly agree) was used to evaluate our graduates’ attitudes regarding their career prospects, achievements, and satisfaction in pharmacy or pharmacy-related professions. Respondents were asked to agree or disagree with six affirmative satisfaction statements in the context of their current jobs. These were related to job setting and position, salary, career progress, advancement opportunities, expectations to achieve professional goals, and the pharmacy profession in general. Overall, graduates were more positive than negative about all aspects of their current position. Approximately two-thirds of the respondents agreed or strongly agreed that they were satisfied with their practice setting and position (mean value 3.7), and their career progress (mean value 3.6) and that they expected to achieve their professional goals (mean value 3.6). Respondents were least satisfied with their salaries in that 30 percent disagreed or strongly disagreed with the statement, “I am satisfied with my salary” (mean value 3.2).

There were no gender differences noted for any of these satisfaction statements; however, there were differences in responses between PRs and NPRs. Overall, PRs were more satisfied than were NPRs with their salaries ($P = 0.04$) and were more likely to believe they would achieve their professional goals ($P = 0.05$). There were no significant differences in responses to the remaining four job satisfaction statements. When job satisfaction was analyzed by practice settings, there were no significant gender differences; however, there were differences by residency status. In general, PRs were more satisfied with their current positions than NPRs, regardless of practice setting.

**DISCUSSION**

**General Observations**

The fraction of our graduates who chose to pursue postgraduate training of all types almost doubled since they were surveyed six years previously (46 in 1988 vs 25 percent in 1982)(3). This signifies a dramatic increase in the percentage of graduates pursuing such training in recent years, since few residency positions were available to our earlier graduates. As in our previous survey, professional contributions and job satisfaction remain high among our graduates and most had positive attitudes about various aspects of pharmacy practice. The percent of our graduates who left pharmacy actually decreased since our previous survey and the time they spent in pharmacy before leaving increased from 3-4 years to a mean of 6.1 years. This is despite the increasing number of women graduating in recent years. This information, together with our observation that most women at any given time were working full time (82 percent), reflects the influence of an economy in which a woman often has no choice whether she will or will not work and supports women’s commitment to the profession.

Over 60 percent of our graduates chose institutions as their site of practice, while only 18 percent practice in community pharmacy settings. The opposite is true nationally. In 1988, two-thirds of practicing pharmacists were engaged in community pharmacy practice and one-fifth practiced in hospitals(7). The recent Pharmacy Manpower Project found that 66 percent of practicing pharmacists are located in community pharmacy settings, while 24 percent practice in hospitals(8). In our estimation, the practice choices of our graduates are predicated on several factors. As described by Day, et al, the roots of the clinical curriculum at UCSF were in hospital pharmacy practice(4). This has strongly influenced the curriculum and faculty practice. As might be expected, graduates have gravitated to practice sites where they felt they could readily apply their clinical knowledge and skills. The success of our graduates as well as PharmD graduates from other California schools in establishing clinical pharmacy services in California hospitals(9) and the large fraction of our graduates pursuing residency training (primarily available in institutional settings) were likely to have influenced career choices as well.

As previously noted, pharmaceutical education is undergoing tremendous change throughout the country. Over the past quarter century, but particularly in the last decade, increasing numbers of schools of pharmacy are offering the PharmD degree as the sole entry-level degree or as an option within their programs (6). As schools begin to prepare for their PharmD programs, the question of graduate outcomes often arises. One concern raised by employers and faculty is the possibility that graduates of such programs
will choose hospital practice in disproportionate numbers. While this did occur with our graduates, we stress that our observations reflect the biases built into our clinical curriculum and the preponderance of hospital-based clinical faculty role models, among other factors. In another study, Lurvey disproved her hypothesis that “more recent graduating classes would be more inclined toward hospital practice because of more clinically-oriented curricula”(10).

She followed pharmacist cohorts who had graduated from three southwestern area colleges of pharmacy in 1966, 1971, 1976, and 1981. The percentage of each cohort that remained in hospital practice over time declined in three of the four classes, including the two most recent classes. Barnett and Matthews(11) surveyed pharmacy graduates from Mercer University and noted little difference in practice patterns between graduates who held BS degrees and entry-level PharmD degrees. Both groups were more likely to practice in independent or chain community pharmacies than in hospital pharmacies (54 vs 19 percent for the BS group and 46 vs 30 percent for the entry-level PharmD group). Those holding post-BS PharmD degrees were more likely to practice in hospitals (48 percent) and “other” settings (41 percent) than in the community (12 percent). Thus, the nature of the curriculum and faculty role models are likely to have a greater influence on career choices than the degree itself.

Influence of Residency Training

The findings of our most recent survey reaffirm the strong and positive influence of residency training on professional outcomes that we observed in our 1982 survey(5).

PRs tended to be more satisfied with their current jobs than were NPRs. This may be attributable to the fact that they reported spending substantially less time than did NPRs in operational activities and more time in clinical activities, were more likely to be involved in teaching and in professional organizations, and commanded relatively higher salaries. It is interesting to speculate why PRs seem to be more involved in their careers. Is there a self selection process that occurs? That is, are those graduates who seek residency training inherently more career oriented than those who do not? Or, could there be a socialization process that occurs in the course of a residency that results in a stronger career orientation?

The important impact of residency training on career outcomes for women, in particular, cannot be overemphasized. As we analyzed our survey data, we found that with few exceptions, residency was a much stronger predictor of differences in career outcomes than was gender and that differences between men and women began to disappear for women who had completed residency training. For example, when the data for women were analyzed in the aggregate, apparent gender differences were observed in full-time work status. However, when a four-way analysis based on gender and residency status was performed, female PRs were nearly as likely as men to work full time. Between male and female residents, there were no significant differences in involvement in clinical practice, teaching or in professional organizations, although men tended to publish more than did women.

Female PRs exhibited annual percent increases in salary that were essentially the same as those for male PRs and NPRs. This is in contrast to our observation in 1982 that the rate of salary increase for women (whether or not they completed postgraduate training) lagged behind that for all men(5). What appears to be a dramatic improvement in the salary trajectory for female residents since the time of our last survey could be explained by increasing numbers of women in positions of greater responsibility and salary. Nevertheless, disparities in mean salaries between male and female PRs remain as do those between male and female NPRs. This observation may reflect the relatively recent entry of women into the profession. Since the largest fraction of women is concentrated in the most recent graduating years, they will have had less time in any particular payroll title. Responsibilities for childbearing and childrearing may also delay movement into higher paying positions. While gender was not found to be a predictor of working overtime, in contrast to residency training and payroll title, our results do not rule out some association between overtime, gender and salary. For example, males may be more likely to secure a particular job category which involves substantial overtime and thus indirectly affects earnings. All of these factors could explain the salary gap which persists between genders, even though it appears to be narrowing.

Gender Effects on Career Outcomes

Our data provide interesting insights into women’s careers. Those who pursued residencies exhibited career patterns that dispel the myths and stereotypes about women with regard to career commitment, hours worked and salaries. This is in contrast to women who did not complete residencies. The latter group worked fewer hours and was more likely to work part-time and take career leaves. Their rate of salary increase over time was significantly lower than all other groups, they tended to start and remain in staff level positions with strong operational components, and they reported fewer professional contributions. Nevertheless, their career satisfaction scores did not differ from other groups, and 74 percent were working full time or more at the time of the study; 16 percent were working at least half time, and 10 percent were spending <20 hrs/week in the profession. Overall, only 7 percent of our graduates have left the profession and men were far more likely than women to have done so.

Career Paths

The data suggest that the primary career path leads into management positions and that gender, rather than postgraduate training, is the major determinant of this observation. Although our curriculum does not emphasize management, about 30 percent of our graduates held management payroll titles and 59 percent indicated they had managerial responsibilities as part of their current jobs. To our surprise, the mean percent of time spent in these activities was greater than that spent in clinical responsibilities (41 vs“29 percent). Our analysis of current payroll titles for those graduates who held clinical pharmacist or specialist titles as their first job indicates that over 40 percent moved into management titles, suggesting that clinical positions per se may offer limited upward mobility. Since the percent of graduates who held clinical titles remained relatively unchanged from first to current positions, it appears that the numbers moving into management or other payroll titles were replaced by an equivalent number moving into clinical titles: Why there is such a dramatic shift into management positions is not clear. However, as noted at the ASHP Invitational Conference on Directions for Clinical Practice in Pharmacy, Directors of Pharmacy are perceived to be one of the most important barriers to the development of clinical pharmacy services(12). Supporting this, a recent survey of pharmaceutical services
Curricular Implications

The American Council on Pharmaceutical Education (ACPE) has recently circulated a proposed revision of accreditation standards and guidelines of the professional program in pharmacy leading to the doctor of pharmacy degree. This proposed revision “embraces the general concept of total quality management [and] supports an interplay between educational processes and outcomes.” Suggested indicators of student achievement or curricular outcomes include student exit interviews, preceptor evaluations, alumni surveys, and standardized licensure examinations. This paper illustrates how alumni surveys can be used to assess curricular outcomes against the School’s mission.

Based on our observations that most of our graduates have a management component in their current jobs and that many move into management positions, we are reviewing and enhancing the pharmacy administration offerings within our curriculum. The faculty have also become sensitized to the need for more of our graduates to move into ambulatory, community, and intermediate care practice settings as impending health care reforms clearly signal a shift in emphasis from critical care to preventative medicine and health maintenance. The faculty are challenged to identify educational reforms that better prepare and motivate our graduates to pursue careers in these practice sectors.

CONCLUSION

Graduates of this entry-level PharmD program were most likely to hold hospital pharmacy positions with integrated clinical, operational, and management responsibilities. The group as a whole was very satisfied with life and generally satisfied with their career progress and pharmacy as a profession. Many of our graduates were involved in teaching, a high fraction were members of professional organizations, a substantial number had held elected offices, served on professional committees, and published at sometime during their careers. A small fraction have left the profession and the vast majority who were practicing were working full time. Almost one-half of our graduates pursued some type of postgraduate training, primarily in the form of residencies, and this had a stronger influence on career outcomes than did gender.

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