RESEARCH BRIEF

Clinical Track Program Expansion Increases Rotation Capacity for Experiential Program

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Objective. To evaluate the rotation capacity at the University of Maryland School of Pharmacy and see if the implementation of clinical track programs across the state correlates to an increase in rotation capacity for the school.

Methods. The following information was collected: number of preceptors over the years in the school’s experiential learning program, number of clinical track programs from 2012 to 2015, rotation type, availability submissions per rotation type per year, and availability submissions per hospital participant in the clinical track program per year. The rotation capacity and rotation types from 2012 to 2015 academic years were assessed and compared to see if there was any impact on the clinical track programs implemented.

Results. There was no statistically significant difference in the frequency distribution of rotation types among all sites from 2012 through 2015 academic years. However, there was a statistically significant difference in the total number/capacity of rotations from 2012 to 2015 academic years. There were also statistically significant differences in the rotation capacity in all sites except for three sites.

Conclusion. Adding clinical track programs can help increase the capacity of a school’s clinical rotations.

Keywords: Advanced Pharmacy Practice Experiences, clinical track program, rotation capacity

INTRODUCTION

Experiential education is a vital component of pharmacy education. As the number of pharmacy schools and student enrollment continue to rise, so does the need for pharmacy practice experiences. Furthermore, the Accreditation Council for Pharmacy Education (ACPE) 2016 Standards place an emphasis on preparing graduates to be practice-ready. The standards also state that the majority of advanced pharmacy practice experiences (APPEs) be focused on direct patient care.1 Additionally, schools are more dependent on non-full-time faculty to serve as preceptors for APPEs. As standards and requirements change, this may impact the willingness of non-faculty preceptors to offer rotations. All of these factors contribute to the necessity for experiential learning programs to secure an ample number of quality APPEs. The challenge is determining an efficient and effective process to achieve this goal.

Various strategies to expand the availability of APPEs have been tried. This includes partnering with health systems and academic medical centers, and developing new services with community health centers and pharmacies.1-3

Innovative approaches to scheduling have also been demonstrated in the literature. Hatton and Weitzel described the benefits of complete-block scheduling for APPEs, such as increased student participation in patient care and medication use responsibilities, in-depth learning experiences, student participation in institutional research and projects, and improved preceptor satisfaction.4 Another advantage is assisting students in preparation for postgraduate training.5 Pharmacy education is aware of these benefits, yet this knowledge has not translated into a significant increase in APPE offerings.

Pharmacy schools struggle to secure opportunities while the deficit of quality rotation sites continues to grow. Danielson and colleagues’ survey of experiential education directors and students entering their final professional year found that rotation site capacity continues to be of highest concern.6 A similar survey conducted 10 years earlier revealed a similar theme.7 This further
### Table 1. APPE Availability for Each Clinical Track Site

| Site | Rotation Type | 2012-2013 | 2014-2015 | 2015-2016 | p value<sup>1</sup> |
|------|---------------|-----------|-----------|-----------|-------------------|
| 1    | APPE 401      | 0         | 0         | 0         | NS                |
|      | APPE 455      | 12        | 20        | 28        |                   |
|      | APPE 451      | 6         | 21        | 26        |                   |
|      | APPCs         | 18        | 30        | 45        |                   |
|      | APEXs         | 19        | 18        | 20        |                   |
|      | Total         | 55        | 89        | 119       | <.0001            |
| 2    | APPE 401      | 8         | 4         | 6         | .0077             |
|      | APPE 455      | 0         | 1         | 3         |                   |
|      | APPE 451      | 3         | 2         | 6         |                   |
|      | APPCs         | 0         | 8         | 12        |                   |
|      | APEXs         | 0         | 4         | 1         |                   |
|      | Total         | 11        | 19        | 28        | NS                |
| 3    | APPE 401      | 0         | 3         | 6         | NS                |
|      | APPE 455      | 0         | 2         | 1         |                   |
|      | APPE 451      | 0         | 5         | 1         |                   |
|      | APPCs         | 0         | 13        | 20        |                   |
|      | APEXs         | 0         | 12        | 7         |                   |
|      | Total         | 0         | 35        | 35        | NS                |
| 4    | APPE 401      | 0         | 2         | 2         | NS                |
|      | APPE 455      | 0         | 3         | 2         |                   |
|      | APPE 451      | 2         | 13        | 8         |                   |
|      | APPCs         | 0         | 20        | 8         |                   |
|      | APEXs         | 0         | 0         | 0         |                   |
|      | Total         | 2         | 38        | 20        | <.0001            |
| 5    | APPE 401      | 0         | 13        | 12        | NS                |
|      | APPE 455      | 0         | 2         | 4         |                   |
|      | APPE 451      | 0         | 11        | 15        |                   |
|      | APPCs         | 0         | 2         | 5         |                   |
|      | APEXs         | 0         | 1         | 3         |                   |
|      | Total         | 0         | 29        | 39        | NS                |
| 6    | APPE 401      | 3         | 3         | 4         | NS                |
|      | APPE 455      | 11        | 11        | 11        |                   |
|      | APPE 451      | 25        | 38        | 42        |                   |
|      | APPCs         | 70        | 76        | 115       |                   |
|      | APEXs         | 3         | 11        | 26        |                   |
|      | Total         | 112       | 139       | 198       | <.0001            |
| 7    | APPE 401      | 0         | 4         | 4         | .0007             |
|      | APPE 455      | 0         | 15        | 14        |                   |
|      | APPE 451      | 0         | 7         | 5         |                   |
|      | APPCs         | 0         | 2         | 12        |                   |
|      | APEXs         | 3         | 0         | 2         |                   |
|      | Total         | 3         | 28        | 37        | <.0001            |

(Continued)
illustrates the continued lack of APPE offerings over the last decade. Furthermore, finding and maintaining rotation sites ranked at the top of the survey.°

It is clear that as experiential education continues to advance, schools and colleges of pharmacy must seek novel methods to increase rotation capacity while maintaining quality experiences. This research aims to identify one potential solution to solve the need for additional APPE offerings by increasing clinical track options for the students.

METHODS

The following de-identified information was collected from the school’s experiential learning management system: number of preceptors over the years in the school’s experiential learning program, number of clinical track programs over the past three years, rotation type (community, ambulatory care, acute care/general medicine and patient care electives, non-patient care electives), availability submissions per rotation type per year, and availability submissions per hospital participant in the clinical track program per year. The rotation capacity and types of rotations from 2012 to 2015 academic years were assessed and compared to see if there was any impact on the clinical track programs implemented. The school switched Learning Management Systems in 2013, and as such, availability data extracted from 2013 was deemed unreliable and excluded from the analysis.

The Fisher’s exact test or the Chi-square test was performed to test the overall association between rotation types and academic years at each site and total number of sites. The Chi-square test was used to compare overall rotation capacity from 2012 to 2015 at each site and total number of sites. Pairwise comparisons with a Bonferroni p value adjustment for multiple comparisons were performed to identify if overall rotation capacity is statistically significantly different from 2012 to 2015. Overall association was tested between rotation types and academic years at each site and total number of sites.

Analyses were performed with SAS version 9.4 (SAS Institute, Cary, NC).

RESULTS

A total of eight clinical track programs were reviewed. After the first medical center implemented a clinical track program in 2011, two other health systems joined in 2012. In 2013, three health systems joined with another two health systems joining in 2014 resulting to a total of eight programs. In 2012, our total preceptor pool was approximately 770. This number jumped to 850 in the summer of 2014 and then to 892 in the summer of 2015.

Table 1 shows the rotation availability for each site and how it changed over the years. The advanced health system rotation (APPE 401) capacity increased from 11 in 2012 to 38 in 2015. The ambulatory care rotation (APPE 455) availability at the clinical track sites increased from 23 in 2012 to 97 in 2015. The acute care/internal medicine rotation (APPE 451) capacity increased from 36 in 2012 to 101 in 2015. The advanced pharmacy patient care electives (APPC) capacity increased from 88 in 2012 to 217 in 2015. The administrative or general practice electives (APEX) capacity increased from 25 in 2012 to 61 in 2015. This translated to the rotation capacity in all eight clinical track sites increasing from 183 in 2012 to 482 in 2015 (Table 2).

Table 1. (Continued)

| Site | Rotation Type | 2012-2013 | 2014-2015 | 2015-2016 | p value1 |
|------|---------------|-----------|-----------|-----------|----------|
| 8    | APPE 401      | 0         | 3         | 4         | NS       |
|      | APPE 455      | 0         | 0         | 0         |          |
|      | APPE 451      | 0         | 0         | 0         |          |
|      | APPCs         | 0         | 0         | 0         |          |
|      | APEXs         | 0         | 0         | 2         |          |
|      | Total         | 0         | 3         | 6         | NS       |

1Chi-square or Fisher’s exact test
APPE=Advanced Pharmacy Practice Experience, APPC=Advanced Patient Care Electives, APEX=Administrative (or General) Practice Electives, NS=Not Significant

Table 2. Total APPE Availability for Clinical Track Sites

| Site  | Rotation type | 2012-13 | 2014-15 | 2015-16 | p value1 |
|-------|---------------|---------|---------|---------|----------|
| Total | APPE 401      | 11      | 32      | 38      | NS       |
|       | APPE 455      | 23      | 54      | 97      |          |
|       | APPE 451      | 36      | 97      | 103     |          |
|       | APPCs         | 88      | 151     | 217     |          |
|       | APEXs         | 25      | 46      | 61      |          |
|       | Total         | 183     | 380     | 482     | <.0001   |

1Chi-square or Fisher’s exact test
APPE=Advanced Pharmacy Practice Experience, APPC=Advanced Patient Care Electives, APEX=Administrative (or General) Practice Electives, NS=Not Significant
Comparing 2012 to 2015 academic years, there was statistically significant difference in the frequency distribution of rotation types at Site #2 ($p = .008$). By comparing 2012 and 2014 academic years, there was statistically significant difference in the frequency distribution of APPE 401 and APPC ($p = .004$) specifically at Site #2. Comparing 2012 to 2015 academic years, there was a statistically significant difference in the frequency distribution of rotation types at Site #7 ($p = .0007$). By comparing 2012 and 2014 academic years, there was also a statistically significant difference in the frequency distribution of APEX rotations and APPE 455 rotations at Site #7 ($p = .0002$). Comparing 2012 to 2015 academic years, there was no statistically significant difference in the frequency distribution of rotation types among all sites ($p = .61$) (Figure 1).

We compared overall rotation capacity from 2012 to 2015 at each site and total number of sites. There was a statistically significant difference in the total number/capacity of rotations in 2012 (183) to 2015 (482) academic years ($p < .0001$) and in 2014 (380) and 2015 (482) total rotation capacity ($p = .0005$) (Table 2). There were also statistically significant differences in the rotation capacity between 2014 to 2015 academic years at each clinical track site and in the total number of sites except for sites #3, #5 and #8 (Table 1). There was also an increase in the number of clinical track sites and applications for the clinical track programs over a period of three years (Figure 2).

DISCUSSION

This study reviewed the capacity of rotation sites at a pharmacy school and the capacity of clinical track rotation sites over the past several years. Pharmacy schools have used clinical track programs to recruit and retain quality rotation sites and experiences for fourth year students. This research is important to pharmacy education because we now have a direct link to how clinical track programs could assist in increasing capacity for experiential education programs to satisfy ACPE requirements.

There was a statistically significant difference in the frequency distribution of rotation types at two sites, although there was no statistically significant difference in the frequency distribution of rotation types among all sites.

The popularity of such clinical track programs with both schools and sites has increased year after year, for example, the University of Maryland School of Pharmacy increased its number of clinical track sites from one to eight in just four years. As the study shows, the capacity
of rotations offered at each site has also increased annually, with most sites providing additional capacity in both required and elective rotations. Given the results of the study, adding clinical track programs appears to be a good strategy to recruit and add rotation capacity for experiential learning programs. Schools can use this study as a model to increase capacity at other institutions.

There are some limitations to this study. Data is provided regarding the increased capacity for each course over the time period, but does not provide information on what percentage of that capacity was filled each year. Did the expansion of clinical track rotation sites lead to excess capacity at those sites? We did not survey the sites to determine why additional slots were provided as the coordinators had changed roles. Generally additional rotation slots were provided as the sites saw value in the presence of motivated students at their respective sites. Most of the additional rotations were available to students completing the clinical track program and in certain cases where there was an excess of capacity at a particular site, the additional slots were made available to other students in the PharmD program.

A second limitation is regarding the details of the efforts by Experiential Learning Program (ELP) staff to recruit new sites and expand capacity at current sites. Information about the marketing of the program has been briefly described. Larger teaching hospitals and medium-sized hospitals were given priority over smaller facilities since the requirement was to provide five rotations per student per year. The ELP office made significant effort to recruit sites that were more popular with students and also maintain and expand the capacity at current sites by building relationships through site visits and meetings as needed. Though it is difficult to measure the extent or strength of a relationship, the question remains whether the return on the effort is significant enough to continue recruitment of new sites. The results of the increased capacity were satisfying for the experiential program.

Finally, the study did not account for the clinical track program’s popularity with students. While the number of students applying to the program also increased each year, the overall effect of popularity on these types of program rotation capacity was not studied.

Additional study on this topic is warranted. Clearly, growth cannot continue unabated. There are a limited number of sites with the wherewithal and willingness to host a clinical track program, and once all of those sites are participating, further expansion will be limited to increased capacity at individual sites, which may also be limited. Further study is warranted to determine the popularity of the clinical track programs with students, whether the number of students applying for positions continue to increase each year, and finally, if the effort required to recruit, maintain and administer the clinical track program is a worthy investment of staff time.

**CONCLUSION**

The introduction of clinical track programs has had a positive effect on rotation capacity for the University of Maryland School of Pharmacy experiential learning program.

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