Intersession Remediation to Minimize Attrition in a Three-Year Pharmacy Program

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Keywords: remediation; accelerated program; pharmacy education; attrition; progression

Total number of manuscript pages: 11

Number of tables: 1

Number of figures: 1

Financial disclosures or conflicts: All authors report no competing interests.
ABSTRACT

Objectives: The primary objective of this article is to describe an intersession remediation process in an accelerated three-year doctor of pharmacy (PharmD) program. The secondary objective is to determine if the remediation process reduced attrition rates, including program withdrawals, progression to advanced pharmacy practice experiences (APPEs), and on-time graduation rates.

Methods: Attrition was defined as dismissal, withdrawal, leave of absence, and/or change in graduation date. Progression data from students who matriculated between 2008 to 2016, with data available through spring 2017, were analyzed for number of course failures and successful intersession remediation. Other factors such as pharmacy year (PY1/PY2), course subject, and course repeats were evaluated to characterize successful remediation attempts and identify elements that foster student success.

Results: Of 812 matriculated students over the time period analyzed, 18.0% (n=146) failed at least one didactic course (defined as course average <69.5%). Overall, 74.7% (n=109) of the students who failed a course remediated, with 75.2% (n=82) of those able to remediate being successful, remaining on-time for graduation. If students who remediated were instead required to repeat coursework, the college attrition rate would have averaged over 10 percentage points higher for the time period analyzed than the actual rate of 13.4%.

Conclusion: Our study demonstrated that the majority of students who qualified for remediation were successful and graduated on-time. Further studies in this area are needed to fully elucidate the effect of remediation processes on learning and retention of knowledge and skills.
INTRODUCTION

One of the primary goals in a doctor of pharmacy (PharmD) program is to prepare students to become competent practitioners while keeping students on track for on-time graduation within the program’s curriculum. Standard 17 of the Accreditation Council for Pharmacy Education (ACPE) Standards 2016 directs colleges and schools of pharmacy to address academic progression and provide students with all policies related to remediation and academic progression.¹ Program quality monitoring through ACPE includes reporting of on-time progression and graduation rates, commonly referred to as attrition rates.² Currently, ACPE does not offer specific definitions for remediation or academic difficulty, nor do the standards prescribe the way these policies should be designed or implemented. This results in a wide-variety of processes used by colleges of pharmacy to tackle poor academic progression with literature identifying many variables to achieve success.³ Remediation practices in a three-year (termed “accelerated”) pharmacy program can be considered particularly challenging due to the condensed nature of the curriculum. Following intense didactic work, students are immediately expected to apply their knowledge through self-directed learning to become practice-ready healthcare providers. Currently, descriptions of successful remediation methods in accelerated PharmD programs are lacking.

Sullivan University College of Pharmacy and Health Sciences (SU COPHS) is a three-year PharmD program consisting of eight quarter terms of didactic and introductory pharmacy practice experiences (IPPEs) lasting 11 weeks in duration separated by a two-week break, followed by seven blocks of six-week advanced pharmacy practice experiences (APPEs) with one-week breaks quarterly. Failure of a prerequisite course during the didactic year could result in a year delay in graduation, loss of school engagement, and financial difficulty for the student. With these concerns in mind, SU COPHS offers qualified students the opportunity to complete remediation coursework during the two-week didactic break between quarters known as the “intersession” period.

The primary objective of this article is to describe an intersession remediation process in an accelerated three-year PharmD program. The secondary objective is to determine if the remediation process reduced attrition rates, including program withdrawals, progression to APPEs, and on-time graduation rates.
METHODS

Beginning with the inaugural matriculation of pharmacy students in 2008, SU COPHS has had a course remediation program to ensure student success. While the exact method of carrying out remediation has evolved over time (oral remediation, written essay examinations, multiple choice questions), fundamental criteria qualifying a student for remediation have remained consistent. The procedure for a student to qualify for intersession course remediation is shown in Figure 1 and is also available online in the SU COPHS Student Handbook. All progression and remediation discussions flow through the institution’s Progression Committee in a confidential manner as prescribed by the college bylaws, and all recommendations from this committee related to individual student progression are sent to the Dean.

Unlike many schools, SU COPHS does not utilize the traditional grading scale and excludes the letter grade of “D.” Our grading scale is out of 100% with final grades stratified in 10-point increments into “A” (>89.4%), “B” (>79.4% to 89.4%), or “C” (>69.4 to 79.4%) being awarded for successful completion of a course. Any course average <69.5% results in a letter grade of “F” which normally would necessitate the retaking of the course in its entirety. If a student has failed one course during the quarter with an overall average of 59.5-69.4% and does not have a pending remediation from a previous quarter, he or she may be allowed to attempt remediation during the intersession period. Students who score <59.5% in any course not eligible for remediation without special approval of the Progression Committee and are required to repeat the course the next time it is offered. Remediation is also allowed if a student has failed two classes during the quarter with a course average 59.5-69.4% if neither of the courses are prerequisites for the following quarter. For a two-course remediation plan, one course can be remediated during the intersession period and the other course can be remediated during the subsequent intersession period. If the student then fails another course prior to completing remediation of the second course failed the previous quarter, the student will not be allowed to remediate and will be delayed one year. Should a student fail three courses in an individual quarter, the student is required to repeat all failed courses when they are offered during the next year. All students who are required to repeat a year are placed on a “modified” schedule for any elective or non-progressive coursework. Any student who fails five courses within a professional year (not within
an individual quarter) is dismissed from the program, as is any student who fails eight or more courses overall (including experiential courses). A student may not take more than two calendar years to complete one professional year of the program, and all PharmD degree requirements must be completed within five calendar years of initial matriculation to the program. Students may appeal dismissal to the dean after receipt of the dismissal letter.

Students who are permitted to remediate during the two-week intersession period are provided a remediation plan by the course coordinator. The remediation plans are developed by the course coordinator in collaboration with the department chair, and the student must agree to and sign the plan. Remediation plans are course-specific but all end with students having to complete an assessment to verify that they have learned the material being remediated. Examples of remediation study plans include strengths and weaknesses assessment and study sessions with a resident or faculty member to discuss exceptionally challenging topics. All remediation activities must be completed before the start of the next quarter. Students who do not pass remediation must repeat the course the next time it is offered.

This study evaluated progression data from all enrolled students from summer 2008 to spring 2017, collected according to the year of matriculation. Data included the number of students who: 1) failed at least one course, 2) qualified or did not qualify for remediation, 3) passed/failed remediation activity, 4) repeated a course, 5) passed/failed a course repeat, and 6) withdrew or were dismissed from the program. Data collected on attrition parameters included: percent withdrawals, percent dismissals, percent with delayed progression, percent overall attrition (including delays, dismissals, and withdrawals), and on-time graduation.

The number of failures per course was collected. Courses were then combined into content domains per the Pharmacy Curriculum Outcomes Assessment® (PCOA) blueprint (Biomedical Sciences, Pharmaceutical Sciences, Clinical Sciences, Social and Behavioral Sciences) as well as academic year and program year (PY1 or PY2). The Sullivan University Institutional Review Board approved this study via an exempt review.

Analysis
Descriptive statistics were used to analyze all data and were examined utilizing Microsoft Excel 2016®. Progression data were compared to ACPE mandates to determine if remediation helped the college stay within ACPE parameters. A chi-square test was used to determine statistical significance between actual attrition rates and the hypothetical attrition rates without remediation. Lastly, data were compared between program years and content domains to determine areas with the greatest number of remediations.

RESULTS

From summer 2008 to spring 2017 a total of 812 students matriculated into the PharmD program. Of these, 146 students (18.0%) failed at least one didactic course (overall course average <69.5%). Class sizes ranged from 74 to 110 over the nine years considered in this study, and the number of students per cohort who failed at least one didactic course ranged from 10 to 24.

Table 1 summarizes the remediation results based on the number of students who qualified for remediation. Overall, of the 146 students who failed a course, 109 (74.7%) qualified for remediation with 82 (75.2%) being successful and staying on time for progression in the didactic curriculum. Based on the attrition rates shown in Table 1, the program had an overall on-time graduation average of 86.6% (range 77.9-92.7%). If students had not remediated but instead had to repeat coursework, the school’s attrition rate would have averaged 23.5% instead of the actual average of 13.4% (p<0.05). This hypothetical attrition rate is reported as “Without Remediation” in Table 1, while the actual rate per matriculated cohort is presented as “With Remediation.”

Overall, 37 (25.3%) students did not qualify for remediation and 27 (24.8%) students failed a remediation attempt. Of the 64 total non-qualified and failed remediation attempt students, 50 (78.1%) passed their repeated course, four students (6.3%) have a pending course repeat as of the publication of this manuscript, and 10 (15.6%) withdrew or were dismissed during the didactic curriculum. This led to an overall attrition rate (including withdrawal, delays, and dismissals) of 13.4% (range 7.3-22.1%), which is below the ACPE accreditation reporting limit of 24%. The average dismissal rate was 1% (range 0-2.9%) which is also below the ACPE accreditation reporting limit of 6%.
Data on student APPE performance was analyzed based on classes in which the matriculated cohort completed all program coursework (2008-2012). Of these five cohorts of students, 74 (15.8%) failed at least one course with 66 students moving on to APPEs either on time or delayed. Of the 66 students, 16 (24.2%) failed an APPE. Of the students who failed only didactic coursework, 65 graduated. Fourteen students who failed both a course and an APPE graduated.

Data were compared between didactic years PY1 and PY2. The percentage of course failures in PY1 was 58.7% compared to 41.3% in PY2. A review of course failures by PCOA blueprint categories found that 25.6% of course failures were in the basic biomedical sciences domain, 20.8% were in the pharmaceutical sciences domain, 9.4% were in the social/behavioral/administrative sciences domain, and 44.2% were in the clinical sciences domain. These data correlate to the didactic year as most of the biomedical and pharmaceutical sciences domain topics are taught in PY1 versus the clinical sciences domain which is taught in PY2.

**DISCUSSION**

This paper describes a strategy to assist students progress through curriculum to practice-ready APPEs and successful licensure, after suffering a setback in passing one or more didactic courses. A specific challenge to be addressed involved the accelerated program at this institution. In many traditional (four-year, non-accelerated) programs, courses can be remediated during a summer, when classes are not in session. Since accelerated didactic coursework is year-round, the opportunity to remediate a course during a summer session is not an option. Another relevant characteristic of this institution is the fact that the grading scale does not award “D” grades. Whereas in some schools a student may progress with some limited number of “D” grades, a letter grade of “F” is assigned for overall course averages <69.5%. However, within the range of 60-69.4% (the traditional “D” range), a student is given the opportunity to remediate a course within the two-week break between quarters. As previously discussed, a grade below 59.5% (a traditional “F” grade) may necessitate retaking the course in its entirety.

A review published in 2010 by Maize et al evaluated remediation programs in pharmacy and other health professions in the United States. They recommended that effective remediation policies include
methods for early detection of students with potential academic distress issues. In addition, they propose that pharmacy programs engage in research evaluating current methods of remediation to ascertain what impact they have on successful completion of the doctoral program (graduation rates), first-time pass rates on the North American Pharmacist Licensure Examination (NAPLEX), job success, and cost/benefit to the institution. A more recent 2013 study by Poirier et al reported on the academic progression and retention policies of colleges and schools of pharmacy. They concluded that pharmacy programs have significantly varied criteria for progression and retention and, overall, provide inadequate information related to these topics to students and prospective students.

Recognition of the need for remediation plans has been addressed in other academic settings including educational psychology and other health professions. Bostow and O’Connor reported on a comparison of two experimental groups (n=41) in an introductory educational psychology course that measured testing procedures. In this study, students in one group (n=20) were required to remediate weekly quizzes if they scored less than 90%, while the second group was not allowed to remediate the quizzes. The results of a 100-question final exam demonstrated that the required remediation group scored an average of one-half letter grade higher than the non-remediated group, which was significant.

Within the nursing profession, various strategies have been examined to facilitate at-risk students successfully completing the licensing exam. Corrigan-Magaldi and Colalillo reported in 2014 on the results of a course management system (CMS) and an online adaptive quizzing program that assisted at-risk students (n=11) to take a more active role in their learning. The CMS allowed faculty to integrate multimedia presentations, additional useful resources, and short module-based reviews for use by the students. Additionally, as a part of the program, students received regular supportive communication from faculty intended to encourage and motivate them. Ninety-one percent of the participants passed the course, and 80% of the at-risk students identified passed the National Council Licensure Examination – Registered Nurse (NCLEX-RN) exam. Several key elements of our course remediation process parallel that reported by Corrigan-Magaldi and Colalillo, including access to the course materials, one-on-one attention and motivation, and access to quizzes and support materials.
Medical educators also recognize the need for a mechanism to assist at-risk students. The results of a targeted remediation process for medical students who failed standardized patient examinations was reported in 2011 by Klamen and Williams. In this two-year study, students who failed the 14-case comprehensive clinical examination, which was a graduation requirement for their program, were enrolled in a month-long focused remediation course designed to treat specific types of clinical performance deficiencies. Students were assessed both pre- and post-course on performance measures including multiple-choice tests measuring diagnostic pattern recognition (DPR), clinical data interpretation, and clinical encounters with standardized participants. Researchers compared post-intervention performance to expected performance based on regression to the mean from the pre-intervention results. In both cohorts analyzed, students scored significantly higher on the post-intervention examinations ($p < .05$) in all but the DPR portion, which was higher post-intervention but failed to reach significance. While robust data are lacking, current literature suggests that remediation programs are useful to help at-risk students successfully complete health profession programs and meet national requirements.

It is possible that not every student is prepared for the accelerated nature of a three-year PharmD program. Students may need to have additional support throughout their curricula to maintain academic progression. The concern regarding effective remediation initiatives in an accelerated program is notable. SU COPHS has implemented several initiatives over the years, such as a modified course schedule, NAPLEX preparatory classes prior to student graduation, and placing students with past remediations on APPEs with faculty to more closely monitor their progression and provide intensive feedback. Additionally, all students meet at least once per quarter as a group with their faculty advisors to review progress on their professional development plan. A guidance document for these sessions is distributed by the Office of Student Affairs, and facilitates group discussion on topics such as self-awareness, emotional intelligence, performance on milestone objective structured clinical examinations (OSCEs) and the PCOA, and professional/career development strategies such as review of curriculum vitae and the American Pharmacists Association Career Pathway Evaluation Program.
It should be noted that it is difficult to interpret the comparability of on-time graduation rates as a metric of remediation program success since comprehensive national remediation and progression rates in pharmacy education have not been reported in the literature or made publicly available. At our institution, data on the number of course failures and remediation success/failures by course are shared with the course coordinators and department chairs in charge of the respective courses as a part of normal curricular quality assurance. Course coordinators are encouraged to use these data to improve not only their courses but also their remediation processes.

Although it is apparent that the current remediation process is successful in aiding students in progressing through the curriculum and graduation, future changes to the remediation process at SU COPHS may include increased standardized delivery of course remediation. A more standardized course remediation delivery process may help better describe impact of specific aspects of the remediation process on metrics of student success. The authors echo the points made by Maize et al that additional research is needed to analyze current remediation strategies to determine the influence they have on academic progression and NAPLEX pass rates. There is a significant gap in the literature regarding remediation best practices and outcomes. This paper offers the first description of and outcomes related to a remediation program in an accelerated three-year pharmacy program. Future areas in which this study could be extended include examination of which specific courses might benefit most from remediation, impact on benchmarks such as the PCOA and NAPLEX, and analysis of more detailed trends that may arise from continuing this process.

CONCLUSION

Giving students the opportunity to remediate coursework within a three-year pharmacy curriculum can be challenging. An effective remediation process allows students to maintain engagement within their matriculated cohort and may lead to success in learning and retention of the knowledge and skills necessary to be an effective pharmacist upon graduation. Overall, our study demonstrated that the majority of students who qualified for remediation were successful and graduated on-time. Thus, the remediation process outlined in this article may be a useful tool for other colleges with a similar schedule. Further studies in this
area are needed to fully elucidate the effect of remediation processes on learning and retention of knowledge and skills.

ACKNOWLEDGEMENTS

The authors would like to thank Frank Facione, PhD, for his contribution to the literature reviews.
REFERENCES
Table 1. Student Qualification and Success in Intersession Remediation and Course Progression by Matriculation Year (N=812)*

<table>
<thead>
<tr>
<th>Year of Matriculation</th>
<th>% (n)</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
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<tbody>
<tr>
<td>Overall</td>
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<tr>
<td>Students who Failed a Course</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qualified and remediated</td>
<td>18.0 (146)</td>
<td>13.5 (10)</td>
<td>12.6 (11)</td>
<td>13.0 (12)</td>
<td>16.3 (17)</td>
<td>21.8 (24)</td>
<td>22.9 (24)</td>
<td>14.9 (11)</td>
<td>26.8 (22)</td>
<td>17.9 (15)</td>
</tr>
<tr>
<td>Did not qualify</td>
<td>25.3 (37)</td>
<td>20.2 (2)</td>
<td>18.2 (2)</td>
<td>16.7 (2)</td>
<td>11.8 (2)</td>
<td>37.5 (9)</td>
<td>45.8 (11)</td>
<td>27.3 (3)</td>
<td>18.2 (4)</td>
<td>13.3 (2)</td>
</tr>
</tbody>
</table>

Results of Remediation

| Did not pass | 24.8 (27) | 50.4 (4) | 44.4 (4) | 70.7 (7) | 40.6 (6) | 93.3 (14) | 100 (13) | 75 (6) | 88.9 (16) | 92.3 (12) |

Repeated Course

| Did not pass or progress | 15.6 (10) | 0 (0) | 14.3 (1) | 60 (3) | 0 (0) | 40 (4) | 9.1 (1) | 0 (0) | 16.7 (1) | 0 (0) |
| Pending a course repeat | 6.3 (4) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 33.3 (2) | 66.7 (2) |

Attrition Rate

| With Remediation | 13.4 (109) | 14.9 (11) | 10.3 (9) | 8.7 (8) | 22.1 (23) | 12.7 (14) | 17.1 (18) | 14.9 (11) | 7.3 (6) | 10.8 (9) |
| Without Remediation | 23.5 (191) | 20.3 (15) | 14.9 (13) | 16.3 (15) | 27.9 (29) | 25.5 (28) | 29.5 (31) | 23.0 (17) | 26.8 (22) | 25 (21) |

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* Pending students as withdrew/dismissed are considered failures for this calculation; Four students are pending a course repeat, and 10 students withdrew or were dismissed from program.

b "Passed" is defined as a final course score of ≥ 69.5%. "Failed" is a final course score <69.5%.

c Qualified (course average between 59.5% and 69.4%)

d Did not qualify (course average <59.5%)

e Students who did not qualify and did not pass remediation

f Attrition rate includes other reasons for attrition besides course failures (voluntary withdrawals, failures of capstone assessments, etc)

# Statistically significant (p<0.05)
SU COPHS does not award “D” letter grades. Any score <69.5 is considered an “F”.

Students who score >59.5% but <69.5% overall in a course are eligible for remediation after discussion by the progression committee.