

Coordinated Approach to Increase Participation of PharmD Students in Basic and Clinical Research Projects

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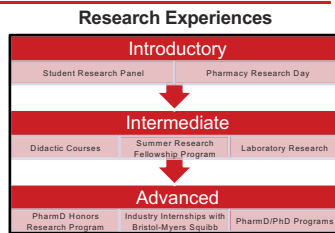


Abstract

Objective: The objective of this project was to increase participation of PharmD students in basic and clinical research studies. **Method:** A three-fold approach was developed to improve the access and quality of research opportunities for PharmD students including 1) development of two new research electives, 2) improvement of the Honors Research program and 3) expansion of the summer fellowship program. **Results:** Two didactic electives focused on hypothesis generation, literature review, and proposal writing were created. The Honors Research Program was improved by allowing a more flexible timeline, an internal website, customized plans of study, presentation opportunities (Pharmacy Research Day), and two directors (clinical and basic research). These changes increased student participation by 380% over 4 semesters. The summer fellowship program was also expanded to include additional career workshops and a field trip to a pharmaceutical company. Funding for the summer program was initially provided by the school's administration. This investment was used to compete for grant funding from NIH (R25ES020721) and professional societies (ASPET and SOT). This strategy increased the number of fellowship positions from 11 to 19-20 over a 2-year period. Additional outcomes include the acceptance of 4 students from the summer fellowship and Honors programs into the dual degree PharmD/PhD program as well as travel awards for students to attend national meetings. **Implications:** Collectively, these data demonstrate a remarkable increase in student participation in research as well as the development of a PharmD/PhD program using a coordinated strategy aimed at coursework, fellowships, and advanced research experiences.

Methods

- A tiered approach to increase the number and quality of research experiences for PharmD students was undertaken.
- Once a year, current and former PharmD students sit on a research panel and describe their experiences with the various research programs in the School of Pharmacy. This session is moderated by one faculty member; however the discussions are primarily among students. This approach has been more effective than informational sessions by faculty directors.
- Pharmacy Research Day was initiated in 2011. Its purpose is to celebrate the research accomplishments of PharmD and PhD students, residents, and postdoctoral fellows. This poster session, which runs for 2 hours in the spring semester, is financially supported by the Dean's Office.
- Two new research courses, *Introduction to Research* and *Bench Pharmacy Research* were developed to introduce students to hypothesis generation, proposal development, IRB and IACUC procedures, literature review, current technologies, and statistical analysis. These courses are run by Dr. Andrew Gow with the assistance of teaching assistants and postdoctoral fellows.
- The summer research fellowship has been in place for over 5 years. The initial program was supported by funding from the Dean of the School of Pharmacy and the department chairs as well as the NIEHS Center for Environmental Exposures and Disease and the Graduate School for Biomedical Sciences. In 2011, additional funding was received from NIEHS and the American Society for Pharmacology and Experimental Therapeutics (ASPET). In 2013, funding was also received from the Society of Toxicology.
- In 2011, the PharmD Honors Research Program was re-vamped to provide a more flexible program that includes didactic courses, thesis drafts due each semester, a peer review process for approval of theses and an internal university website for communication between the students and program directors.
- A public-private partnership with Bristol-Myers Squibb has been fostered at Rutgers University to provide summer research internships for PharmD students and a field trip for Rutgers summer fellows.
- Collectively, all of these initiatives have supported the development of two PharmD/PhD programs in Pharmaceutical Sciences and Toxicology. Four P3 students began the PharmD/PhD curriculum in Fall 2012 and one P3 student is beginning the PharmD/PhD curriculum in Fall 2013. One PharmD/PhD student was awarded a F31 fellowship from NIH in 2013.



PharmD Honors Research Program

Description

- Students in the Program conduct at least 8 credits of laboratory- or clinical-based research under the guidance of an EMSOP faculty member.
- Students take 2 didactic electives focused on research methods and a subject related to their research project.
- Students write and present a thesis project.

Application

- Pharmacy students with a cumulative GPA of 3.3 or higher can join as early as spring P2 semester or as late as fall P2 semester.
- Students first need to find an EMSOP faculty member to serve as their mentor. Then, the faculty member writes a letter of recommendation to the Program Directors accepting the student into their laboratory or clinical site.
- Students should also submit 1 page letters of intent to the Program Directors describing why they seek admission into the Program and their goals and expectations for the Program.

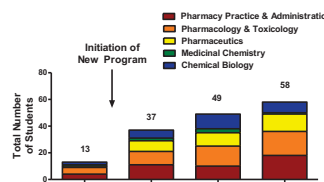
Directors

- There are two Program Directors that oversee the program:
 - Dr. Mary Wagner oversees students working with clinical faculty in the Department of Pharmacy Practice & Administration.
 - Dr. Lauren Aleksunes oversees students working with basic research faculty in the Departments of Chemical Biology, Pharmaceutics, Pharmacology/Toxicology, and Medicinal Chemistry.

Current Students

- There are 15 Honors students working at clinical sites such as Robert Wood Johnson University Hospital, Somerset Medical Center, and St. Barnabas Medical Center.
- There are over 40 Honors students working in laboratories in the School of Pharmacy, Environmental and Occupational Health Sciences Institute, Psychology, Laboratory for Cancer Research, and the Center for Dermal Research.
- Website: https://pharm.rutgers.edu/content/pharmd_honors_research_program

A. Program Enrollment



B. Program Completion

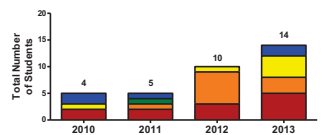


Figure 1. Enrollment and Completion Rate of the PharmD Honors Research Program. (A) Total or cumulative enrollment of all P2-P4 students each year. (B) Completion rate of students who give their final presentation and submitted thesis each year. Students can complete the Honors Program in the spring of any year (typically P2-P3 year). The number of students is shown above each column.

Pharmacy Research Day

- Research posters were presented by PharmD students, PhD students, residents and post-graduate fellows.
- Abstract books were distributed to attendees, including alumni, students, faculty, industry contacts, and administrators.



Research Posters Presented

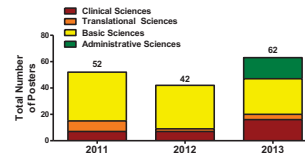
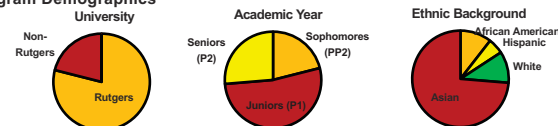


Figure 2. Composition of Research Posters at Pharmacy Research Day by Discipline. The Administrative Sciences discipline was added in 2013. The total number of posters per year is shown above each column.

Summer Research Fellowship

Program Demographics



Program Description

- 10 week full-time summer fellowship in research laboratories and clinical sites
- The goal is to promote careers in pharmaceutical, toxicology, environmental health and clinical research.
- Students are recruited from Rutgers and nationwide using professional societies and the Rutgers RiSE program.
- Students meet weekly with Program Directors and participate in career development, networking, seminar and ethics training.
- In 2012, students visited the New Brunswick site of Bristol-Myers Squibb, toured laboratories, and had lunch with scientists.
- Students presented their research findings as podium talks during the last two weeks.

Training Activities



Fellowship Participation

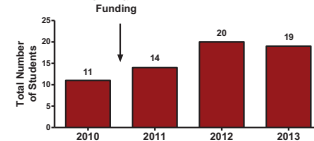
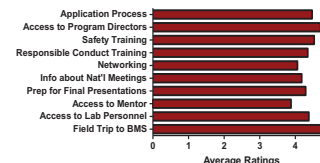


Figure 3. Number of Funded Summer Fellowships. The total number of fellowship positions per year is shown above each column.

Bristol-Myers Squibb Field Trip: 2012

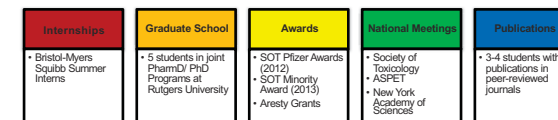


Program Evaluation: 2012



- The Survey Monkey website was used to evaluate student satisfaction.
- All 19 students were invited to participate – 17 students completed the survey.
- Rating-based questions were as follows: 1, Poor; 2, Fair; 3, Good; 4, Very Good; 5, Excellent
- Student satisfaction data are shown.
 - 94% of students reported that they would recommend the summer program to their friends.
 - 87.5% of students reported that they would like to continue their research beyond the summer program.
 - 100% of students reported that the weekly seminars enhanced the summer research experience.

Program Outcomes from 2010-2013



Funding & Administrative Support for the Summer Research Fellowship

