

**Ernest Mario School of Pharmacy
PharmD Working Group Report
2018-2019**

WORKING GROUP OVERVIEW

1. Introduction

The Ernest Mario School of Pharmacy (EMSOP) is a leading educational institution dedicated to excellence in health care and biomedical education, innovative and visionary research and scholarship in the pharmaceutical sciences, exemplary clinical practice, partnerships with industry, and outreach and community services that address the needs of the citizens of New Jersey and society at-large. The School offers a preeminent Doctor of Pharmacy (PharmD) program, which provides students with a strong foundation in basic and clinical sciences coupled with an emphasis on patient-centered care. The program offers diverse opportunities and experience in clinical practice, industry, public health agencies, managed care, and laboratory and computational research.

2. Charge

Rutgers Biomedical and Health Sciences (RBHS) is launching a formal review of the Ernest Mario School of Pharmacy. The Working Group on the PharmD program will provide the Schoolwide Review Committee with a report that documents and evaluates the degree program and recommends policies, procedures, and resource allocations that further the program's goals. The review process should begin with a brief SWOT analysis (strengths, weaknesses, opportunities, threats). The process should be prospective, focusing on the efforts to enhance the quality of the program and build its national reputation in research, teaching, clinical practice, and service. The process should be collaborative and collegial, and should provide independent and objective feedback, metrics on performance and the achievement of goals, and instill confidence in the faculty.

The report of the Working Group on the PharmD Program should include the following:

- ❖ Brief history of the PharmD program
- ❖ Description of the current curriculum, including rationale for recent changes
- ❖ Description of current assessment of learning outcomes and plans for assessment of new curricular and co-curricular components

- ❖ Description/assessment of:
 - Current/planned interprofessional programs
 - Current/planned co-curricular requirements
 - Portfolio as a professional development tool
- ❖ Evaluation of experiential program, program sites, student readiness for rotations
- ❖ Academic plans for PharmD program, including five-year goals
- ❖ Listings of PharmD program faculty, faculty/student noteworthy accomplishments
- ❖ Comparison of program with peer and aspirant pharmacy schools (using selected metrics)
- ❖ Initial, limited assessment of compliance with Accreditation Council on Pharmacy Education (ACPE) Standards 2016, in preparation for 2019-2020 accreditation self-study
- ❖ Other issues, as identified by the Working Group, that would benefit from evaluation and would contribute to the program's development
- ❖ Recommendations for teaching, research, clinical practice, and/or service resources to achieve identified goals.

The Working Group on the PharmD Program shall:

- ❖ Conduct meetings and interviews with internal and external constituents as needed
- ❖ Solicit comments and feedback on the preliminary report from faculty, staff, and students, at the committee's discretion
- ❖ Present a final report to the Dean and to the Schoolwide Review Committee that is prospective rather than retrospective and includes a resource document and a summary of recommendations for the PharmD program to pursue.
- ❖ Report should be submitted by January 18, 2019.

3. Membership:

The membership of the working group consisted of members from the School's clinical and basic science departments. The members of the PharmD Program Working Group are:

Evelyn Hermes-DeSantis (*Chair*)
Maria Cardinale (*Vice Chair*)
Lauren Aleksunes
Patrick Bridgeman
Donna Feudo
Leonid Kagan

Rupal Mansukhani
Navaneeth Narayanan
Laura Sclafani
Anita Siu
Mary Wagner
Michael Wynd
Monica Peram (*Staff*)

4. Meeting Dates

The full committee met five times while the Chair, Vice Chair, and Staff meet more frequently. The five full meetings were held on October 17th, November 5th, November 29th, January 4th, and January 14th.

5. Meetings with School Administrators, Faculty, Staff, Students

At all of the full committee meetings, Carol Goldin, representing the School Administration, was present and provided valuable insight and feedback. The draft copy of the report was also discussed with a number of 4th professional year (P4) students and recent alumni on January 15, 2019.

DOCUMENTATION REVIEWED

1. Ernest Mario School of Pharmacy Website for Mission, Goals, Strategic Plan, and other pertinent information
2. Self-Study Report of Rutgers, the State University of New Jersey, Ernest Mario School of Pharmacy, submitted to the Accreditation Council for Pharmacy Education June 2011
3. Interim Report of Rutgers, The State University of New Jersey, EMSOP, submitted to the Accreditation Council for Pharmacy Education October 2015
4. Websites of peer and peer- aspirant Schools of Pharmacy (i.e., Big Ten) for evaluating pertinent information
5. Strategic planning report, RBHS, 2014-2019
6. Strategic planning report, EMSOP, 2015-2020
7. Other publicly available data concerning schools of pharmacy (i.e., NAPLEX Test results, ASHP Midyear Meeting poster presentations, etc.)

BACKGROUND

1. History/Context

The Ernest Mario School of Pharmacy (EMSOP) has a long and illustrious history, dating back to 1892 when the pharmacy program was located in Newark. Since 1971, the school has been housed primarily in the William Levine Building on the Busch Campus in Piscataway.

The School offers a preeminent Doctor of Pharmacy (PharmD) program, which provides students with a strong foundation in basic and clinical sciences coupled with an emphasis on patient-centered care. The program offers diverse opportunities and experience in clinical practice, industry, public health agencies, managed care, and laboratory and computational research.

The PharmD Program at the EMSOP was developed and initiated in 1989 with the first class graduating in 1991 with three post-baccalaureate pharmacists and seven students tracking in from the Bachelor of Science (B.S.) pharmacy class. From its inception until 2002, both the B.S. (a 5-year program) and the PharmD program co-existed. The PharmD degree continuing growing and was available via two paths: as a 2-year, post-BS degree; and as a “track-in” 6-year program (offered based on application after the fourth year of pharmacy school). The last B.S. class graduated in 2002. During the 2000-2001 Academic Year the School ceased offering the B.S. degree and now only offers the PharmD degree, in step with accreditation requirements nationally. Since that time the class size has grown to approximately 215. The Department of Pharmacy Practice and Administration also grew dramatically to accommodate the increasing need of experiential teaching.

Students benefit from a research honors program and various dual-degree programs: PharmD/PhD, PharmD/MBA, PharmD/MPH, and PharmD/MD (the first such program in the U.S.). In September 2014, the School launched a new MS program in health outcomes, policy, and economics (HOPE), offered jointly with the School of Public Health. Faculty are also involved with other MS and PhD programs, including multidisciplinary research training opportunities in pharmaceutical and biomedical sciences, pharmacoeconomics, and related health and basic science fields, offered in collaboration with colleagues throughout Rutgers.

In 2017, another curricular revision occurred with a shift to organ-system modules combining pharmacology and therapeutic courses as well as the addition of a longitudinal, 5-semester skills-based course. (See **Appendix 1** for poster presentation) This corresponded with an expansion to the building. This new facility, built adjacent to Levine, provides state-of-the-art teaching and research space for EMSOP, supports collaborative programs, and offers schools and units within RBHS access to shared facilities, equipment, and laboratories capable of advanced simulation education. Additional information on simulation is detailed later in this report.

2. Organizational Chart

See **Appendix** for the Organizational Chart from January 2019.

3. Mission/Goals

The Ernest Mario School of Pharmacy is dedicated to excellence in pharmacy, healthcare and biomedical education; innovative and visionary research and scholarship in the pharmaceutical, biomedical, social, and clinical sciences; provision of safe and effective pharmaceutical care through exemplary clinical practice; innovative and effective interprofessional collaboration in education, research, and clinical practice; and outreach community services that address the needs of the citizens of New Jersey and society at large.

To this end, the following strategic themes focusing on the PharmD Program have been pursued over the past five years:

- ❖ Support curriculum renewal and opportunities for innovation in teaching and learning.
- ❖ Enhance reputation and national rankings of the School.
- ❖ Strengthen research in basic, translational, clinical, and population health sciences.
- ❖ Continue to enhance clinical practice activities.
- ❖ Augment mentoring and professional development within the School.
- ❖ Enhance the School of Pharmacy's role in RBHS interprofessional education.
- ❖ Augment internal and external communications.
- ❖ Enhance alumni and stakeholder integration.
- ❖ Prioritize administrative services to support strategic priorities in teaching, research, clinical practice, and student initiatives.

4. Brief Description of the education, research, clinical, and/or community service programs relevant to the mission of this program

The four pillars of the School are Teaching, Practice, Research, and Service. The PharmD Program is enhanced by, and enhances, all four pillars.

Teaching:

The current curriculum of the School is composed of a didactic portion (70%) and an experiential portion (30%). The curriculum for the PharmD program was developed and approved by the entire faculty of the School. As a result of mapping the curriculum to our Ability-Based Outcomes (ABOs) and analyses of assessment data, revisions were proposed and subsequently approved by the faculty. Approximately 40% of the didactic portion has undergone a significant transition to

a new organ module pharmacology/therapeutics sequencing. The curriculum has been rounded out with the addition of the integrated Pharmacotherapy Assessment Skills Series (iPASS), a 5-semester sequenced course aligned with the pharmacology/therapeutics sequence, and the Leadership | Entrepreneurship & Innovation | Assessment of Self | Professionalism (LEAP) seminar to address aspects of ACPE Standards 2016.

The curricular structure is configured in a two-plus-four format (a minimum of two pre-professional years and four professional years). The content is sequenced with the basic science courses and other foundational components are taught early, with most of the basic science, humanities, and social science courses in the pre-professional years. Basic science prerequisites provide a solid foundation for the introductory courses in the pharmaceutical sciences in the first professional (P1) year. As part of our efforts to inculcate the ideas of professionalism, some courses presented early in the professional portion of the curriculum deal specifically with the concepts and principles of patient centered pharmaceutical care. (See **Appendix 3** for the new curriculum) Strategically over the years there has been an emphasis on creating new and innovative elective courses. The capacity to teach these courses is due in part to the additional Pharmacy Practice faculty that have been hired over the years.

The Educational Goals and Outcome Assessment (EGOA) Committee will be assessing the new curriculum, along with the emphasis on co-curricular activities. The Committee will review the American Association of Colleges of Pharmacy (AACCP) Graduating Student and Preceptors Surveys from 2018 through 2020 to determine a baseline for comparison with the surveys once students have been through the new curriculum in 2021. Additionally, the committee will assess student's personal and professional development through LEAP, co-curricular activities, and interprofessional educational sessions documented in the portfolio requirement.

The experiential program focuses on providing the students with hands on experiences. During the summer following P1 year, students complete a 4-week Introductory Pharmacy Practice Experience (IPPE) in a Community Practice setting. During the summer following the second professional (P2) year, students complete a 4-week Intermediate Pharmacy Practice Experience (IPPE) in a Hospital/ Institutional Practice setting. Approximately 1750 volunteer adjunct preceptors host and support the IPPE rotations. During the P4 year, students participate in eight 5-week Advanced Pharmacy Practice Experiences (APPEs) for a total of 1600 hours, exceeding the State of New Jersey requirement of 1440 hours. Of the eight

rotations each student takes, at least three rotations are provided by the clinical faculty of the School and the rest with our volunteer adjunct preceptors. Some students elect to complete an additional APPE rotation, for an additional 200 hours.

Clinical Practice:

The faculty of the Department of Pharmacy Practice and Administration maintain clinical practices at over 20 key institutional and clinic sites throughout New Jersey, including the RWJBarnabas Health System, Hackensack/Meridian Health System, Atlantic Health, and others. Primary clinical practice areas include general internal medicine, infectious disease, critical care, emergency medicine, pediatrics, oncology, neuropsychiatric pharmacotherapy, and others. In addition, comprehensive clinical residency and fellowship programs in diverse fields, including pharmacy practice, the pharmaceutical industry, and health outcomes research, are available to postdoctoral trainees. The clinical practice for the faculty informs their teaching and scholarly activity.

Research:

The PharmD program has numerous opportunities for students to engage in research. The program is also bolstered by the quality of research undertaken by the faculty. An in-depth analysis of the research program available to students is offered under the Findings section of this report.

Service:

Outreach and professional service is a cornerstone for a well-rounded pharmacist. Through more than 19 student professional associations and organizations, a broad range of outreach activities is undertaken each semester. These programs supplement the PharmD program through co-curricular activities allowing students to apply many of the learned skills and knowledge first hand to the patients they can serve.

5. Academic Plans

The 2015 – 2020 Strategic Plan for the Ernest Mario School of Pharmacy emphasizes dedication to the pursuit of excellence in pharmacy education, innovative research, exemplary clinical practice, interprofessional collaboration, and community outreach. These aspirations reflect the mission of RBHS to be known as one of the best academic health centers in the nation. The meaningful contribution of EMSOP to elevate the reputation of RBHS depends on the success of the PharmD program, which is the foundation on which EMSOP can achieve excellence as a leader in pharmacy education. Specifically, the role of the PharmD program is to prepare students to engage in innovative biomedical, social, and clinical research,

demonstrate the value of interprofessional collaboration early in the academic career, and produce service-minded pharmacy professionals that contribute in a meaningful way to the well-being of the members of the community. A major theme of the Strategic Plan of EMSOP is to support curriculum renewal and innovation in teaching and learning. Crucial to the successful realization of this theme is the redesign of the structure of the PharmD curriculum, with a greater emphasis on case-based learning and application of knowledge to clinical scenarios. The purpose of the new curriculum is to bridge the gap between didactic and experiential education and prepare students more efficiently for meaningful and impactful careers. The new curriculum was first offered to the class of 2021 and coincided with the completion of exciting and revolutionary new teaching spaces in the pharmacy building that allow for interactive learning in ways that could never be accomplished before.

In addition, the new curriculum and new teaching space allows for the expansion of the interprofessional education offerings to include students in all years of the professional program. Students will be participating in a seminar series each semester (LEAP) which will focus on leadership, entrepreneurship and innovation, assessment of self, and professionalism. The students will be documenting their co-curricular, interprofessional, and other associated activities through the student electronic portfolio. The ability to data-mine the portfolio will allow the School to assess the impact these activities have the students as well as the impact our students are having on the community.

6. Lists of program faculty, post-docs, resources, accomplishments, other data as appropriate.

Faculty

The Faculty of the School is listed in **Appendix 4**.

Post-Doctoral Resources

In addition, numerous post-doctoral trainees including residents, industry fellows, and PhD students contribute to the teaching mission in support of the PharmD program. Many of teaching initiatives, such as iPASS would not be possible without the assistance of the post-doctoral trainees. Overall, these post-doctoral trainees assist with some of the following classes:

- ❖ Acute Care
- ❖ Byrne Seminar – Pediatric Drug Research, Medical Literature Discovery, and Smart Eating and Living for a Healthy and Happy Life
- ❖ Cardiology Pharmacotherapy

- ❖ Community Practice Management
- ❖ Diet, Nutrition, and Disease Prevention in Pharmacy Practice
- ❖ Foundations to Pharmaceutical Care
- ❖ Gastrointestinal, Hepatic and Nutritional Pharmacology
- ❖ Hematology Pharmacotherapy
- ❖ History of Pharmacy
- ❖ Hospital Practice Management
- ❖ Intro Pharmaceutics
- ❖ Intro to Research
- ❖ Infectious Diseases Pharmacotherapy
- ❖ iPASS 1 - 5
- ❖ Leadership in Pharmacy
- ❖ Literature Evaluation and Application
- ❖ Molecular Biology & Pharmaceutical Biotechnology
- ❖ Motivating Changes as a Health Ambassador for Diabetes Mellitus
- ❖ Oncology Pharmacotherapy
- ❖ Pathophysiology
- ❖ Pharmaceutical Economics
- ❖ Pharmaceutical Industry
- ❖ Pharmacogenomics and Precision Medicine
- ❖ Pharmacology and Pharmacogenetics
- ❖ Pharmacy communications
- ❖ Pharmaceutical Microbiology
- ❖ Physiology
- ❖ Physical Assessment
- ❖ Poison Management and Drug Abuse
- ❖ Renal Pharmacotherapy

Residents and industry fellows may enroll in the Teaching and Learning Certificate (TLC) program offered by the Department of Pharmacy Practice and Administration. The TLC program prepares resident and fellow trainees as future experiential educators and refines the areas of writing objectives, developing an experiential syllabus, fine-tuning feedback and assessment, handling academic integrity, and creating a practice site in Introductory or Advanced Pharmacy Practice Experiences. Since the program's inception in 2012, the participants have provided students with 203 IPPE and 72 APPE Rotations.

Academic Services

The Office of Academic Services provides academic advising to all students with special emphasis on students in the two pre-professional years of the PharmD program. The Office oversees services in areas such as orientation, registration, and scheduling of classes and provides information for prospective students on

admissions and transfer policies. Student services also include monitoring academic progress, certification of graduation and maintaining all student files.

Student Development

The Office for Student Development (OSD) offers a variety of student support services designed to cultivate academic, personal, and professional development. Student retention and academic success is approached from a holistic perspective. It is our belief that if students are to reach their full academic potential, they must maintain a balance in all areas of their being. In order to facilitate this balance, the following programs and activities are offered to the student body:

- Individualized counseling to help students with a wide variety of personal and academic concerns
- Small group tutoring in core curricular courses, as well as in the most challenging subjects
- Transition orientation for students entering the P1 year and transferring in to our pharmacy program
- Workshops on time, money, and nutrition management
- Professionalism, resume writing, and interviewing techniques
- Programs on self-esteem and confidence building
- Stress management and stress reduction techniques
- Seminars and retreats on how to survive and thrive in their daily living experiences
- Career advising

Educational Opportunity Fund

The Ernest Mario School of Pharmacy Educational Opportunity Fund (EOF) Program is committed to providing access and opportunity to low-income, first-generation students who demonstrate commitment, determination and potential for success in an academically rigorous and challenging curriculum. The program assists students who are capable and motivated and provides them with financial support as well as academic, career, and personal counseling for as long as they maintain their enrollment status and meet other program eligibility requirements. Each student also works closely with an assigned adviser/counselor who works with them on a plan of action for success.

Experiential Program

The Experiential Program at EMSOP comprises approximately 30% of the curriculum and includes Introductory, Intermediate, and Advanced Pharmacy Practice Experiences (IPPEs and APPEs). The experiential based course work occurs throughout the professional curriculum beginning in the summer after the first

professional year. The experiential coursework is routinely identified by graduating students as the most valuable part of the curriculum. The teaching of the experiential program is conducted by both our full-time clinical faculty of the PPA department and our adjunct faculty preceptors. Of the eight five-week APPE rotations, our designated adjunct faculty preceptors host up to five rotation requirements and our full-time clinical faculty host a minimum three. Our IPPE rotation requirements are hosted and facilitated exclusively by adjunct faculty preceptors. Our adjunct faculty preceptors are “volunteers” and are not employed by the School in contrast to our full-time clinical faculty. Our adjunct faculty preceptors receive “adjunct faculty” status, library resources, continuing education programs for preceptor development, and continuing education credits for hosting students.

With our volunteer adjunct faculty preceptors numbering over 1700, the reach and impact of the PharmD program extends to the entire state of New Jersey and beyond. Currently, our over 1100 experiential sites include community, hospital/institutional, ambulatory care, inpatient ambulatory care, home infusion, government, public health, clinical practice, and industry. Each of our experiential sites is assessed through student evaluations and an in-person site visits every three years. On-site visits are performed to directly observe and evaluate practice functions, preceptor-student interaction, collaboration amongst internal and external team members if applicable, and allow for discussion with site practice leaders and/or adjunct preceptors. On-site visits may also supplement education to the site, adjunct preceptor and/or student, as well as identify new, emerging, and unique learning opportunities. Furthermore, on-site visits aid in enhancing communication and ensuring that students have consistent experiences that consistently meet the goals and learning objectives of the specific rotation. Typically, preceptors are at sites where we have long standing relationships, though we continue to search out those pharmacists who wish to join our program.

However, there is competition for sites and preceptors from other schools of pharmacy. The availability for hosting students is not consistent from year to year because of sites’ needs and staff workload.

Accommodations

The Offices of Experiential, Student Services, and Development have consolidated efforts to assist in identifying, creating and addressing didactic and experiential accommodations for students who have identified needs due to mental, physical, or emotional needs or disabilities. For experiential rotations we work with our partnered sites and preceptors to identify appropriate sites and environments

where the students may be successful in attaining the competencies and goals of each designated rotation type.

Library Services

Faculty, students, post-doctoral trainees, and preceptors have access to the Rutgers Library system. The online resources are an invaluable asset for research, teaching, and practice. Resources such as AccessPharmacy, American Pharmacists Association PharmacyLibrary, Facts & Comparison eAnswers, International Pharmaceutical Abstracts, King Guide to Parenteral Admixtures, Lexicomp Online, Medline, Micromedex, and other databases in addition to the plethora of online journals is vital for pharmacy practice. In addition, having a dedicated librarian for the School is critical for enhancing the utilization of these and other resources.

Space Description of Teaching and Studying Areas

In fall 2017 the School opened the expansion to the building. The new space puts patient-centered, team-based care at the center of pharmacy education. The space features 60,000 square feet of state-of-the-art classrooms, hospital simulations space, mock IV admixture lab, transitions of care pharmacy, patient assessment rooms, and administrative space. Specifically, the area includes the following:

- ❖ *Auditoriums*: Two 250 seat auditorium-style lecture halls are equipped with state-of-the-art digital learning technologies. This allows an entire class of pharmacy students to learn in the School together.
- ❖ *Mannino Community Pharmacy Laboratory*: A mock community pharmacy is fully equipped to teach students crucial patient-center skills, including communication, health assessment, telepharmacy, and medication therapy management.
- ❖ *Patient Assessment Suite*: Seventeen large, well-equipped patient assessment rooms allow students to develop practical skills in patient interaction and procedures. A control room supports the complex network of interactive learning technologies.
- ❖ *Hospital Simulation Suite*: A mock hospital suite allows students to participate in life-like patient care scenarios, using high-fidelity mannequins that mimic physical conditions and drug responses. A flexible floor plan allows two of the four hospital rooms to be combined into one large space and the rooms to be reconfigures into alternative practice settings.
- ❖ *Mock IV Admixture Suite*: The mock IV admixture suite ensures that our students are thoroughly trained in sterile and nonsterile compounding and regulatory practices, using appropriate equipment and specially

formulated mock ingredients. The space includes a lab with 12 horizontal laminar flow hoods and anteroom for scrubbing and dressing.

- ❖ *Small Classrooms:* There are four new small classrooms ranging in size from 48 to 60 seats.
 - A 48-person classroom adjacent to the patient assessment labs creates a comprehensive suite of learning space for the community practice area.
 - A 48-person classroom adjacent to the mock IV admixture lab creates a comprehensive suite of learning space for the hospital practice area.
 - Two 60-person multipurpose classrooms which are connected to each of the three simulated learning suites via state-of-the-art digital technologies. Students can observe simulation activities from these classrooms and interact with peers and professors in the sim rooms, extending the simulated learning process.
- ❖ *Small-Group Rooms and Study areas:* There are three small group learning rooms and four group study rooms. The three larger flexible-use rooms are available for students to meet in small groups to work on class projects, hold student organization meetings, or practice team-based healthcare techniques. The four group study rooms support small group studies or meetings. A student study area occupies a mezzanine overlooking the atrium and open lounge areas feature soft seating and flexible workspace for solo or group study.
- ❖ *Atrium and student commons:* With seating for 100, this gathering place is the perfect spot for students to study alone or in small groups or hold informal meetings. It has been used for poster sessions to large receptions

New Technologies

Beginning in 2018, the School obtained a schoolwide license for Poll Everywhere usage in the preprofessional year 2 to professional year 3 courses. Poll Everywhere is accessed by learners using their electronic devices (laptops, cell phones, tablets, and iPads). Learners answer polling questions including types that are used on the NAPLEX licensure exam (e.g., multiple choice, drop pin, etc.). Faculty have also initiated use of a number of the resources offered by Rutgers' Teaching and Learning Technologies including Kaltura which allows for video capture of presentations for use in flipped classroom style teaching. Other technologies used include TurnItIn (plagiarism-check software), EHR Go (simulated educational electronic health record), Learning Space (lecture video recording), and Piazza

(course communication amongst students and instructors). In addition, the School has recently adopted the use of ExamSoft for administering exams on computers.

Faculty Development

The faculty development program at the School has been expanding. The Department of Pharmacy Practice and Administration hosts quarterly programs on timely topics applying to both experiential and didactic teaching and related areas of concern within the School. Topics have focused on needle sticks and introduction to Rutgers Environmental Health & Safety, increasing the number students on rotation, interactive learning strategies, grant writing, at risk students, and IPE facilitator education. The Center for Teaching Advancement and Assessment Research at Rutgers has provided a number of additional trainings and assistance. With the above-mentioned new technologies, faculty have attended trainings and workshops throughout the year with the goal of familiarizing them with available technologies, sharing tips and tricks, and connecting new users with established users.

Student Advising

The Student Advising Program at the School is designed to support and guide student pharmacists as they transition through the professional years of the PharmD program. Each student pharmacist is assigned a personal advisor in the first professional year which amounts to roughly 16 students (4 per professional year) paired with each faculty advisor. Advisors oversee and support students' successful completion of the professional curriculum and transition into the profession of pharmacy.

Honors College

The School is committed to the unique experience offered through the Honors College, a living-learning community focused on tackling complex problems and global challenges. The Honors College motto is *Curiosity. Knowledge. Purpose.* The Honors College is a place where meaningful innovation is born out of collaboration between students and faculty from across the liberal arts and professional schools.

At the center of the Honors College experience is the mission course where social innovation and collaboration are the focus, and where many ideas are initiated and later developed. Each year, approximately 500 students are invited to begin their four-year experience as part of the Honors College. The Honors College community includes students from the liberal arts and professional schools at Rutgers–New Brunswick: the School of Arts and Sciences, School of Environmental and Biological Sciences, School of Engineering, Rutgers Business School, Ernest Mario School of Pharmacy, and Mason Gross School of the Arts.

Currently, approximately 100 Honors College students are pre-pharmacy students at the Ernest Mario School of Pharmacy. As Honors College Scholars, these students partake in the general School of Pharmacy curriculum while also being exposed to a living-learning community made up of students from across the University. These students have many opportunities from the very beginning, including research and extensive collaboration with fellow students from across disciplines throughout the University. In addition to the collaborative environment at the Honors College, each student must complete a capstone project. Projects range from community outreach to enrollment into the EMSOP Honors Research Program.

Our Pharmacy students are exposed to additional courses in the liberal arts and complete a capstone experience by the end of their fourth year (second professional year). Our Pharmacy Honors Scholars are among our highest performing students and most culminate their experience in the Honors College with a capstone project. Our EMSOP Honors College Scholars participate in at least 30 hours of service and have opportunities to pursue in innovative classroom experience such as the Motivating Change as a Health Ambassador for Diabetes Mellitus course or specialized research opportunities.

Additional accomplishments under Findings

FINDINGS

1. Achievements (last 5 years)

The achievements of the PharmD program over the last five years are highlighted by the achievements of our students.

Strong Applicant Base

The achievements of the PharmD program start with the high achieving students that provide a strong applicant base. The incoming freshman class has an average Math/Verbal SAT score of approximately 1450. There has been a decline in the number of applicants to Rutgers and to the other Big Ten Pharmacy Schools; however, this has not negatively impacted our ability to fill our roster with top notch students. While we are still receiving over 1700 applications for the 220 seats, that number has significantly decreased from 3300 applications per year five years ago. The faculty are considering outreach opportunities to address this issue.

Student Awards, Presentations, and Publications

Our PharmD students have also earned a significant number of awards, given numerous presentations, and participated in a wide range of scholarly activities.

Over the last five years the number of student posters submitted and accepted for presentation at national meetings has increased. In 2013 there were 27 student posters presented at ASHP Midyear Clinical meeting, increasing to over 60 in 2018. In addition, our students present at various other national meetings including the APhA Annual meeting, ACCP, and other medical meetings. For example, Rena Rai (P3) and Parth Vadiya (P2) had their research project, “Retrospective Study of Linezolid versus Daptomycin for the Treatment of Vancomycin- Resistant Enterococcal Bloodstream Infection” accepted as a research poster and presented at IDWeek 2017 in San Diego, CA. IDWeek is an annual global scientific meeting of infectious diseases professionals featuring the latest science in prevention, diagnosis, treatment, and epidemiology of infectious diseases. It is a combined annual meeting of the Infectious Diseases Society of America (IDSA), the Society for Healthcare Epidemiology of America (SHEA), the HIV Medicine Association (HIVMA), and the Pediatric Infectious Diseases Society (PIDS).

A partial listing of student accomplishments is provided in **Appendix 5**.

NAPLEX Licensure Exam

The School has a proud reputation for having a high passing rate on the NAPLEX exam. Figure 1 documents this higher pass rate than the national average and similar to other Big10 Schools. The faculty of the School have identified a slight decrease in the performance of the students in recent years. The School will be implementing new programming in the Pharmacy Reflection Seminar, held at during the last few months of the P4 year to assist with improving our NAPLEX pass rate. In addition, the impact of the curricular changes is still unknown.

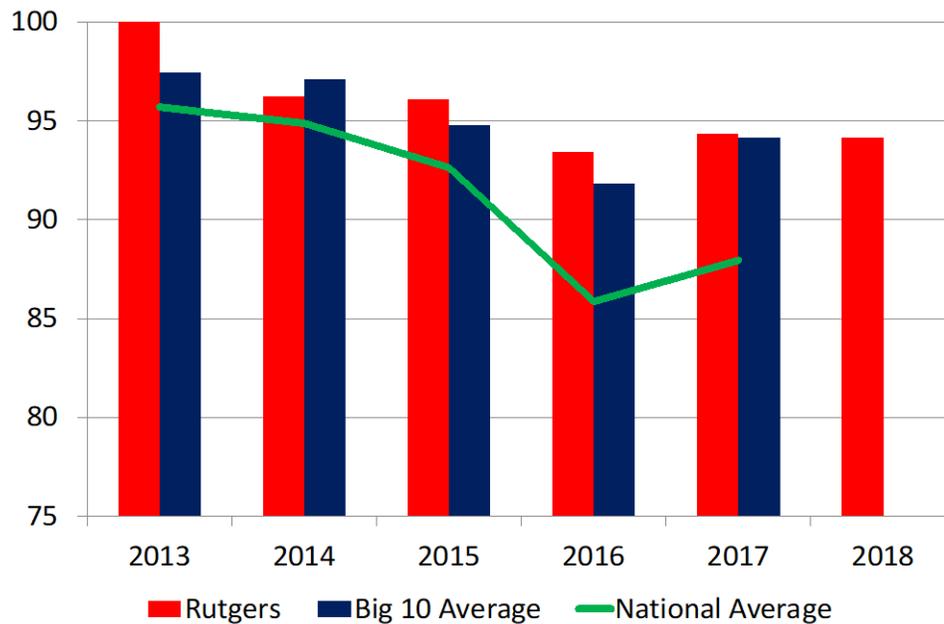


Figure 1. NAPLEX pass rates for Rutgers Students compared to Big 10 and National Average.

Obtaining Residency, Fellowships, Other Post-Doctoral Training, and Employment

Post-doctoral training programs in Pharmacy Practice Residencies and Pharmaceutical Industry Fellowships are highly sought after. The American Society of Health-System Pharmacists report the application and placement rate for their accredited PGY1 residency programs. Overall, the national placement rate for a PGY1 residency is 64%. For the 2018 graduating class, our placement rate for PGY1 residencies is 72%. While this rate is above the national average, it should be noted that this was based on 58 students applying for residencies. Additionally, a number of Rutgers students seek pharmaceutical industry fellowship positions. For this class of 2018, 25 of our students received a fellowship position (approximately 50% of those who applied) in the Rutgers Fellowship program, considerably higher than the national acceptance rate of approximately 16%. Overall, it is estimated that 38% of the graduating class are engaged in a residency or fellowship program post-graduation.

Each year a smaller number of students pursue other post-doctoral training programs such as PhD, MD, or JD programs. Overall, approximately 72% our graduates, on the day of graduation, have secured either a position within a post-doctoral training program or employment. However, because we do not follow-up

with our graduates in the months following graduation, we do not have a complete picture of their success in obtaining employment.

Dual Degree Programs

The School is proud to offer a number of dual-degree options for the PharmD students. Currently, the School offers PharmD/PhD, PharmD/MBA, PharmD/MPH, and PharmD/MD programs. May 2019 will mark the first students graduating with their MD degree as part of the PharmD/MD program.

- PharmD/MBA: Approximately 15 graduates have completed this program. Most of these students go into the part-time program, with several new students being admitted each year. While most students complete the second degree, others take several courses that are useful for them professionally, without finishing the degree.
- PharmD/MPH: Once enrolled in this program it is a pathway for our students to take courses in epidemiology, biostatistics, and policy. Once students graduate from the PharmD program they matriculate into the School of Public Health to formally enroll in the MPH program.
- PharmD/PhD: To date approximately four students have completed the PharmD/PhD program with one to three students enrolling per year.
- PharmD/MD: To date a total of 15 students are enrolled in this program. In Spring 2019 the first three students will be graduating medical school.

2. Strengths

The strengths of the PharmD program highlighted below include Curricular Revision and Active Learning Strategies, Interprofessional Education, Simulation, Knights Scholar, Research Opportunities, Experiential Sites, Exposure to Various Opportunities. Additional strengths are outlined in **Appendix 6** SWOT Analysis.

Curriculum Revision and Active Learning Strategies

EMSOP launched a review and revision of its PharmD curriculum in 2016, using a systematic approach with three stages: Design, Develop, Execute. During *Stage 1 Design*, working groups of basic and clinical science faculty reviewed curricula, assessed preparedness for Advanced Pharmacy Practice Experiences, and considered a variety of integration approaches.

Stage 2 Develop lead to new curricular initiatives included:

- 1) Creation of a new organ-focused physiology class in the second preprofessional year taught by faculty of the School,

- 2) Horizontal integration of pharmacology, clinical pharmacokinetics, and pharmacotherapy courses into organ-defined modules across P2 and P3 years (i.e., Pulmonary, Cardiology, etc.),
- 3) Creation of a novel skills-based, vertically integrated Pharmacotherapy Assessment Skills Series (iPASS) reinforcing lecture content,
- 4) Addition of a required sterile admixture course,
- 5) Development of a longitudinal professionalism seminar called LEAP (Leadership | Entrepreneurship & Innovation | Assessment of Self | Professionalism).

Bringing the physiology course in-house has provided earlier interaction of pre-professional students with School faculty and more targeted instruction that prepares students for the organ-based pharmacotherapy modules. The integration of pharmacology, clinical pharmacokinetics, and pharmacotherapy courses into 11 organ-defined modules during the P2 and P3 year has enabled team-based teaching of basic and clinical science that addresses the 2016 ACCP Pharmacotherapy Curriculum Toolkit. Importantly, the iPASS series, which has been developed to align content with the organ-based pharmacotherapy modules, covers physical assessment, journal club, calculations, objective-structured clinical examination, documentation of a SOAP note (Subjective, Objective, Assessment and Plan), and simulations. Critical for iPASS and the sterile admixture course was an expansive infrastructure upgrade with state-of-the-art simulation suites for transitions of care, sterile admixture preparation, acquisition of new electronic health record software, and patient simulation. LEAP was designed as a 0 credit seminar series held each semester of the professional year to address ACPE Standard 4 and focuses on interactive development of soft and interprofessional skills. In total, the new courses represent a re-alignment of 40% of the PharmD curriculum. *Stage 3 Execute* started in spring 2018 with the first iPASS course and continued in earnest for P2 students in fall 2018 with integrated coursework and assessments of basic science and clinical knowledge in the pharmacotherapy curriculum.

Critical to the redesign of the curriculum has been the institution of active learning strategies to engage learners. Basic and clinical science faculty have participated in workshops designed by university instructional designers and pharmacy faculty to create active learning strategies for 200+-person classes. Active learning approaches include: 1) student-generated questions; 2) lecture check; 3) think, pair, share; and 4) classroom games. In addition, the School has acquired a license for Poll Everywhere to enhance student engagement in the classroom and ExamSoft for examination. In addition to improving the training of Teaching Assistants, the School of Pharmacy has begun to utilize Rutgers Learning Assistants, who are PharmD

students who have previously completed coursework, to help build active learning activities. Importantly, the improvements in the delivery of pharmacy curriculum and expansion of active learning strategies have been disseminated at national conferences including the American Association of Colleges of Pharmacy and the American Society for Pharmacology and Experimental Therapeutics.

Interprofessional Education

For over five years, students in the EMSOP have participated in, and contributed to, numerous Interprofessional Education (IPE) programs within RBHS. Students in EMSOP are exposed early in their academic careers to the importance of interdisciplinary collaboration and teamwork to healthcare in the twenty-first century. Currently, the IPE programs are highly robust and include students from as many as nine other disciplines, including various student prescribers. In 2018, approximately 17 opportunities were offered to the students at EMSOP, with the first exposure to IPE beginning in the fall of the P1 year in the form of an orientation.

During the P3 year, various elective courses include an IPE element. As a component of their clinical rotations portfolio, P4 students are required to complete at least one of several formal IPE events. One such event is the Special Populations Interprofessional Care Experiences (SPICE), run by the School of Dental Medicine, which includes weekly case conferences that are facilitated by faculty from multiple schools and include over 100 students from the pharmacy, dental, social work, medicine, nursing, nutrition, and dental hygiene programs. In addition, all P4 students are also required to participate in a Medication Errors event, in which students of various disciplines learn the importance of effective communication and documentation between individuals of different health professions. Several other student-coordinated IPE events are also offered and highlight the students' recognition of the value of IPE in preparing them for successful careers in the modern healthcare system.

Simulation

Completed in the fall of 2017, the building addition affords the students in the PharmD program with some of the most state-of-the-art and versatile facilities available at Rutgers University. Among the new and exciting teaching spaces are a high-fidelity simulation lab and a realistic and fully equipped sterile compounding lab. The simulation lab includes four high fidelity adult manikins, multiple pediatric manikins, and state of the art equipment that mirror the environments students are likely to encounter on clinical rotations. Currently, the simulation labs are used to conduct multiple realistic simulation-based scenarios in several clinical electives, including Critical Care Elective and Pediatrics Elective. Scenarios typically require

the students to work collaboratively to assess an acute situation, identify and prioritize the patient's pharmacotherapy-related problems, and respond with appropriate interventions. Following simulation activities, a debriefing period is performed to allow the students to reflect on the experience. The simulation activities have been extremely well received by the students, who consistently provide positive feedback on their experiences. With the addition of a Director of Simulation, the sophistication of the simulation lab is evolving, and with each semester more technology is utilized to enhance the overall experience of the students. In the spring semester of 2019, the addition of the electronic medical record (EHR Go) and the Learning Space video recording system will improve the simulation experience even further. Lastly, various core classes will begin to incorporate simulation into the learning experience and provide an engaging and interactive method to drive home important clinical pearls.

The sterile compounding lab is also a highly sophisticated teaching space that includes 12 laminar flow workbenches, an isolation glove box and a biosafety cabinet, as well as a fully equipped anteroom. With the addition of this lab, for the first time sterile admixture and aseptic technique can be offered to all students and will be offered as part of the core curriculum to the P2 students beginning in the spring of 2019. The class teaches essential compounding techniques and includes a didactic as well as practical and hands-on component where students can practice with real supplies. This class is offered at a critical time where hospitals around the country are diligently attempting to comply to the regulations associated with major changes in the national standards for the preparation of sterile products as well as the preparation of hazardous drugs. Knowledge of these regulations is crucial for graduating students entering the current and future pharmacy workforce.

Knight Scholar

The Knight Scholar Program is a longitudinal rotation experience in which motivated P4 students participate in a block of four APPE rotations within the same institution. The program allows the students to have a longitudinal relationship with a particular site. It emulates a residency program in the sense that the students become more comfortable with specific procedures at the site, and they can become involved with projects that normally would not be possible during a standard 5-week APPE rotation. The student is also able to complete a research project that requires development and submission of an Institutional Review Board (IRB) application, and presentation of a scientific poster at a national conference. In the 2018-2019 academic year, there were 18 students in nine sites participating in the Knight Scholar program. All of these students presented their research projects at a

national conference in 2018. Fifty-nine percent of these students match with a residency program.

Research Opportunities

Beginning in 2011, a tiered approach to increase the number and quality of research experiences for PharmD students was undertaken. This approach was developed to improve the access and quality of research opportunities for PharmD students including 1) development of two new didactic research-focused electives, 2) improvement of the Honors Research program, and 3) expansion of the summer fellowship program. The two new research courses, *Introduction to Research* (30:720:301) and *Principles of Research in Pharmacy* (30:720:401) were developed to introduce students to hypothesis generation, proposal development, IRB and Institutional Animal Care and Use Committee (IACUC) procedures, literature review, current technologies, and statistical analysis. Often, students in these courses pursue parallel research training in laboratories or clinical sites where they earn elective credits. In 2011, the PharmD Honors Research Program was revamped to provide a more flexible program that includes the didactic research courses, thesis drafts due each semester, and a peer review process for approval of theses. A research forum is hosted by the Honors Research program twice a year to introduce students to faculty research projects. One mechanism that enables Honors students to complete their research projects is the Summer Undergraduate Research Fellowship (SURF) sponsored by the School. While the SURF program has been in place for over 10 years, it has been expanded in the last 7 years. The initial program was supported by funding from the Dean of EMSOP and the department chairs as well as the NIEHS Center for Environmental Exposures and Disease. In 2011, additional funding was received from NIH/NIEHS in the form of an R25 ES020721 grant (PI: Aleksunes and Laskin) and the American Society for Pharmacology and Experimental Therapeutics (ASPET). In 2013, funding was also received from the Society of Toxicology to bring enrollment to typically 25 to 30 students per summer. A public-private partnership with Bristol-Myers Squibb has been fostered and often provides summer research internships for PharmD students and a field trip for Rutgers SURF fellows.

To celebrate the research accomplishments of PharmD and PhD students, residents, and postdoctoral fellows, an annual Pharmacy Research Day was initiated in 2011. This session highlights over 100 trainee posters and provides a dynamic forum for the dissemination of research findings with the School. Research Day also functions to familiarize PP2-P1 students with research opportunities they can pursue.

Current initiatives are underway to further pharmacy student engagement in research including the identification of research capstone projects for pharmacy students in the Honors College as well as collaborative projects within the School as well as across RBHS.

Experiential Sites

The over 1100 experiential sites that host our students during their IPPE and APPE rotations are truly strengths of the program. Students experience a wide array of pharmacy practice settings from community practice in chain and independent pharmacies, to hospital/institutional practice in small rural to large academic trauma centers, and a variety of other practice settings including home infusion, government, public health, pharmaceutical industry, and others. Students also successfully compete for general elective rotations at federal facilities including VA hospitals, the FDA, the CDC, and the Indian Health Service.

Exposure to Various Opportunities

Though the curriculum, the variety of elective courses available, numerous student organizations, elective rotations, and support for internships, our students are exposed to a large variety of opportunities that highlight the expansive area of pharmacy involvement. Based on our geographic location and the close partnership with the pharmaceutical industry through the Rutgers Institute for Pharmaceutical Industry Fellowships, our students have a comprehensive exposure to the role of pharmacists within the pharmaceutical industry.

3. Areas for Improvement

Through the process of conducting this review, a number of areas for improvement were identified.

- ❖ *Communications* – The development of a central process of data collection and dissemination for awards, student accomplishments, faculty accomplishments, etc., would be helpful. This would also provide opportunities for enhanced marketing of the School and the PharmD program within the profession of pharmacy and within the State of New Jersey.
- ❖ *Wrap-Around Career and Advising Services* – Currently both the School and the University offer numerous career services for students. University Career Services is committed to assisting students with making connections between their academic experience and career paths. They provide career-related counseling, resources, and programs to help individuals clarify academic and career goals, establish career plans, develop job-search skills, and make successful career transitions.

However, students on the annual student survey conducted by AACCP, routinely comment on the lack of services or services specific to pharmacy. Systemizing the current offerings, highlighting career opportunities earlier, and enhancing awareness of both the School and University services would enhance the students understanding and utilization of the services. Additionally, bolstering the current student advising system will aid student progression. This may also help improve the employment rate at graduation.

- ❖ *Pharmacy Reflection Seminar* – The School is enhancing the existing current Pharmacy Reflection Seminar to improve the students’ performance on the NAPLEX for licensure and the MJPE law exam.
- ❖ *Expansion of Active Learning* – The School has encouraged incorporation of active learning into the didactic and simulation curriculum. Development of additional training opportunities will encourage faculty to consistently include active learning activities throughout the curriculum (i.e., cases, SOAP notes, PollEverywhere, etc.).
- ❖ *Migration to Canvas* – The University is currently shifting one of the learning platforms from Sakai to Canvas. The opportunities available utilizing the newer technologies will allow for expanded online support of the program.

4. Assessment of Goals and/or Strategic Directions

In order to continue advancing the goals and strategic direction of the PharmD program, the School continues to follow and work through the Strategic Plan 2015 – 2020. The strategic plan has been actively pursued with six working groups focusing on the specific areas addressed in the plan. This Schoolwide review has been intentionally conducted to feed into our upcoming self-study program which will result in the creation of a Self-Study Report to be submitted to the Accreditation Council for Pharmacy Education in June 2020. Measures of success of strategic initiatives may include the following:

- ❖ NAPLEX rate
- ❖ A comprehensive repository of student accomplishments
- ❖ Simulation experiences within the curriculum
- ❖ Interprofessional education experiences throughout the curriculum
- ❖ Residency, fellowship, and other post-doctoral training placement rate

5. Assessment of Current Operational and Capital Resource Needs

The PharmD program is fortunate to be part of RBHS and the wealth of resources available through such a large and expansive healthcare focused unit within the

University. There are a number of current operational and capital resource needs that this report has highlighted including:

- ❖ *Responsibility Centered Management* – The implications of the newly adopted budgeting model for the School are still being assessed.
- ❖ *Stipend to Preceptors* –In November 2012, EMSOP implemented an honorarium (now called stipend to be in compliance with RU policies) program beginning with 2013 - 2014 IPPE and APPE Hospital/ Institutional Rotation requirements. The honorarium program reflected compensation of \$400 per IPPE Hospital/Institutional Rotation and \$500 per APPE Hospital/Institutional Rotation requirements. This honorarium has been paid directly to the institution on a quarterly basis. In September 2018 the APPE Clinical Other Rotation was added to the program for a cost of \$600 per rotation. These monies assist our hospital partners in using funds for educational and certification needs of pharmacists in the department at the site. By utilizing the individuals trained within the TLC program for the IPPE Hospital/Institutional Rotation requirements, the school has been able to offset approximately \$80,000 over the last five years.
- ❖ *Instructional Design Personnel* – The School will be hiring a new, part-time Instructional Course Designer to support the identification of critical skills, design and implementation of instructional strategies for success, and assessment of professional development through the School’s expanding interprofessional (IPE) programs, co-curricular activities, and portfolio requirements.
- ❖ *Simulation* – As the School continues to develop and grow the simulation program within the curriculum as well as for expanded interprofessional opportunities, additional resources will be needed to bolster this area.

RECOMMENDATIONS

1. Suggested New Opportunities and/or Directions that can be pursued with minimal new resources

In order to support the mission, vision and goals described in this report, it is evident there are new opportunities and infrastructure that require either minimal or extensive time, effort or resources to address. The following priorities are areas that should be undertaken in the short-term with minimal resources necessary.

- ❖ **Licensure Exam Scores** – The faculty responsible for the coordination of the Pharmacy Reflection Seminar should focus on maintaining the high NAPLEX pass rate and improving the MJPE pass rate. Additional

utilization of widely available NAPLEX review tools such as the APhA Library should be evaluated.

- ❖ **Active Learning and Technology** – Faculty should expand and codify the expectations of active learning and associated technologies to improve the impact on the curriculum. Implementing the use of an EHR in the iPASS curriculum as well as other courses will provide the students with usable skills and knowledge applicable to the clinical setting. Expanding the use of ExamSoft will provide valuable data assessing the student performance on specific exams as well as attaining the Abilities Based Outcomes of the curriculum. Migration to Canvas will enhance the online components of the curriculum through the new learning management system.
- ❖ **Cultural Competencies** - The course leadership of iPASS and LEAP should work to incorporate more cultural competencies directly related to experiences with different cultures, backgrounds, and generations to better prepare students for success as students as well as pharmacists in a very diverse society.
- ❖ **Research** -Research opportunities for faculty, students, and preceptors should be expanded with improved collaboration both within the School and across the units of RBHS.
- ❖ **Communications and Marketing** – As part of this critical review, awareness of all of the accomplishments and services provided was highlighted as an area for improvement. A systematic centralized process for documenting, communicating, organizing, and archiving student accomplishments should be developed to provide a useful communication and marketing tool. Additionally, improving awareness of our current offerings for career services would enhance the student experience and utilization of this valuable resource.
- ❖ **Recruitment and Diversity** – As the School is concerned with the declining number of applicants, outreach programs to high schools utilizing our current student organizations should be developed. In addition, bolstering the diversity of recruitment of students and faculty of underrepresented minorities is needed to strengthen the program. For students we should consider strengthened outreach programs (including pipeline programs) for incoming and transfer students. For faculty, it is important the faculty represent the diversity profile of the student population as well as the population of the State and communities that we serve.
- ❖ **Experiential Sites: Expansion and Quality Assurance** - The Experiential Program should continue to identify and expand

opportunities with the assistance from referrals by our faculty, alumni, and our network of our current preceptors. In addition, we need to continually strive to ensure and improve the rotations and advance the profession of pharmacy.

2. Suggested Longer-Term Opportunities and/or new Directions that require new operational and/or capital resources.

In the longer term, the School needs to explore those opportunities for enhancing the student and faculty experience in the PharmD program. Specifically, as these opportunities may require new operational and/or capital resources, these are longer-term goals to pursue.

- ❖ **Increase staff support** – The organization and assessment of a number of critically important areas including student portfolio, co-curricular activities, and IPE, is a challenging task. In addition, support in the area of instructional design would be helpful in the iPASS sequencing of courses.
- ❖ **Communications and Marketing** – While some of the communication and marketing issues identified in this report can be addressed with minimal resources for organization; new support for communications may require additional funding.
- ❖ **Expansion of Teaching Assistant Positions** – With the new curriculum and the focus on active learning strategies and increased technology, the utilization of teaching assistants (TA) and learning assistants (LA) need to expand. In addition, there is a need for increased training of these individuals, as well as the faculty utilizing them for consistency. Overall, there is a need for more organization and additional TA positions to support the curriculum.
- ❖ **Recruitment Process** – As we focus on attracting a more diverse student body and faculty to better reflect the diversity of the state and underrepresented minorities, additional resources and infrastructure may be required.
- ❖ **Philanthropy** – Developing a culture of philanthropy with a focus on the students is critical to the School. Scholarships focused on the diverse student population, first generation college students, and the P3 and P4 students who are not eligible for student aid are important. As the number of students participating in research is increasing, the costs to send them to national meetings to present their research is very high. Additional philanthropic support for students presenting research to cover conference costs including registration and travel is necessary.

APPENDICES

Appendix 1. Poster presentation: An Interactive and Integrated Pharmacotherapy and Skills-Based Curriculum: Bridging Basic and Clinical Sciences. Presented at AACP Annual Meeting 2018



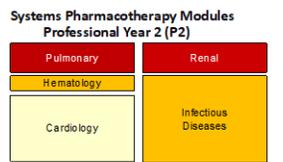
An Interactive and Integrated Pharmacotherapy and Skills-Based Curriculum: Bridging Basic and Clinical Science

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 Rutgers, The State University of New Jersey, Ernest Mario School of Pharmacy, 1Department of Pharmacy Practice and Administration, 2Department of Pharmacology and Toxicology, 3 Office of the Dean, Piscataway, NJ

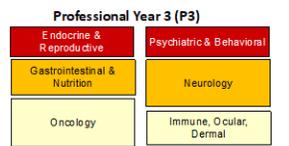


Stage 1: Design

Teaching Strategic Planning Objectives
Objective 1: To enhance the preparedness of students for clinical assessment and examination of patients.
 • Approach: Vertical integration of pharmacy skills-based courses into a 5 semester series (iPASS)
Objective 2: To extend the alignment and integration of organ system content in courses.
 • Approach: Horizontal integration of pharmacology, therapeutics, and clinical pharmacokinetics courses into organ modules



Objective 3: To ensure compliance with the ACPE Standards 2016.
 • Approach: Development of a 6 semester seminar series on professionalism, leadership, entrepreneurship, and assessment
Objective 4: To expand the utilization of technology and innovative teaching methods in the new addition to the School.
 • Approach: Workshops aimed at utilization of new technologies available to faculty



• The integrated pharmacotherapy modules include team teaching between basic and clinical science faculty, flipped classroom content, methods for retention, and integrated assessments.

Integrated Pharmacotherapy Application and Skills Series (iPASS)

• Precceptors evaluated the average Cycle 1 or 2 student for their ability to perform the following skills:

Level of Preparedness for Rotations	Aug	in
Drug and Medical Knowledge		
Develop, integrate, and apply knowledge	3.5	32
Explain drug action	3.8	32
Medical Information		
Collect and interpret evidence	3.7	32
Evaluate the scientific literature	3.7	32
Patient Assessment and Evaluation		
Solve therapeutic problems	3.3	32
Provide patient-centered care	3.5	31
Prioritize/formulate assessments and treatment options	3.4	32
Implement, monitor and adjust plans	3.4	31
Document activities	3.8	30
Design prevention, intervention, and educational strategies to improve health and wellness	3.6	30

• The iPASS series spans 5 semesters beginning in Spring P1 and aligns with the pharmacotherapy modules in the P2 and P3 years.
 o For example, iPASS covers inhaler technique, chest auscultation, and corticosteroid counseling while students are concurrently taking the Pulmonary module.

Weeks	Skills	Activities
1	Communications	Medication & Patient History
2	Physical Assessment	Hands-On Skills
3	Patient Cases	
4	Objective Structured Clinical Examination	
5	Counseling	Simulations, Counseling
6	Patient Cases	Drug Information, Informatics, Electronic
7	Counseling	Self Care
8	Self Care	Medical Records, Online
9	Objective Structured Clinical Examination	Content, Debates
10	Patient Cases	
11	Self Care/Counseling	
12	Evidence-Based Pharmacy	Pharmacoeconomics & Journal Club
13		
14		

Finals (High Stakes Exam)

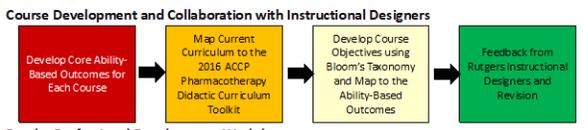
o The iPASS series includes the coordinated care of a Rutgers family with increasingly more complicated and changing medical concerns

Stage 2: Development

Leadership | Entrepreneurship & Innovation | Assessment of Self | Professionalism (LEAP)

	Fall Semester		Spring Semester	
	Element	Activity	Element	Activity
P1 Year	Professionalism	Professionalism 101	Leadership	Mentorship
	Self-Awareness	Managing Change	Entrepreneurship	Innovation Types
P2 Year	Professionalism	Cultural Competence	Leadership	Strategic Thinking
	Self-Awareness	Career Planning	Entrepreneurship	Business Plans
P3 Year	Professionalism	Ethics & Empathy	Leadership	Managing Down
	Self-Awareness	Work-Life Balance	Entrepreneurship	Presentations

• Seminars will meet key elements of ACPE Standard 4 while reflecting on corresponding co-curricular requirements.



- A series of workshops were developed to empower faculty to utilize a variety of classroom and online resources for their teaching.
- Workshops were designed by instructional designers, pharmacy faculty, and service providers.
- Approximately 20 to 35 faculty or teaching assistants participated in each workshop.
- Most common strategies to be utilized:



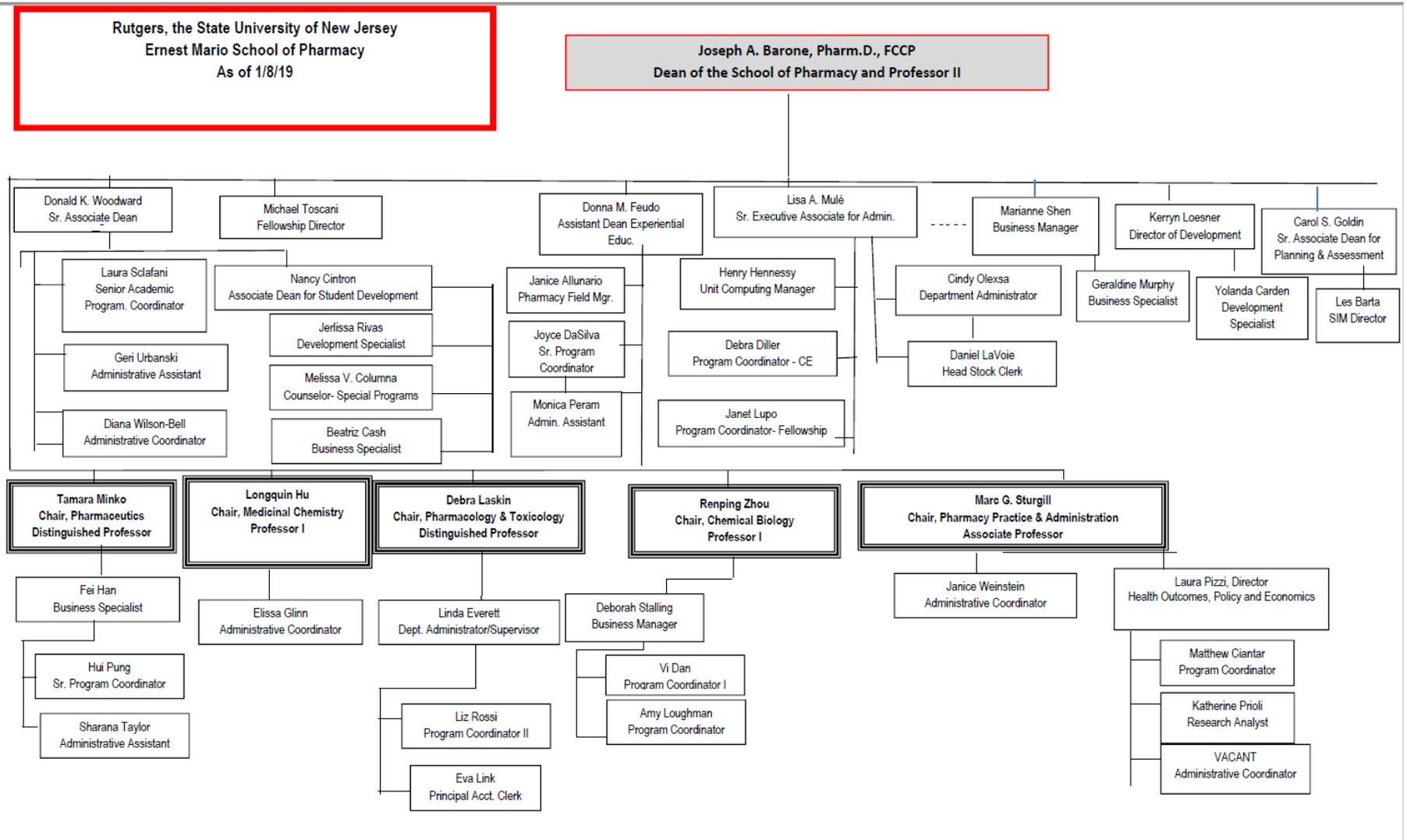
Stage 3: Execute



- Case Study: iPASS P1 Course**
- The first semester of the 5 semester iPASS course offered in Spring P1.
 - A 3 credits course created by the combination of 2 credits of Concepts of Pharmacy and 1 credit of Drug Information course.
 - Traditional class room lecture for 55 minutes followed by 2 hour hands-on active learning in the Transitions of Care Lab.
 - Grades assigned based on 2 exams, 2 communication practicums, and weekly assignments.
- Case Study: Pharmacology & Pharmacogenetics P1 Course**
- A P1 foundations course in Pharmacology and Pharmacogenetics was revised to align with the Pharmacotherapy Organ Modules and included team teaching by 3 basic science and 2 clinical science faculty.
 - A variety of active learning elements were added to the course and well-received by student.
 - Most effective elements were:
 - Instructor-generated practice question
 - Activity points in the course grade
 - Poll every where
 - Weeks summary tab on Sakai

Author Contact Information	
Author Contact Information Evelyn Hermes-DeSantis Ernest Mario School of Pharmacy Piscataway, New Jersey ehemesd@pharmacy.rutgers.edu	Disclosures The authors have nothing to disclose

Appendix 2. Organizational Chart



Appendix 3. Professional Years of PharmD Curriculum (Class of 2019 and beyond)

First Professional Year (P1)

First Term			Second Term		
Class Name	Class No	Credits	Class Name	Class No	Credits
Introductory Biochemistry and Molecular Biology	01:694:301	3	Molecular Biology and Pharmaceutical Biotechnology	30:158:315	3
Pharmaceutical Chemistry	30:715:306	2	Pharmacology and Pharmacogenetics	30:718:320	3
Pathophysiology	30:718:304	3	Drug Delivery and Lab	30:721:320	4
Introduction to Pharmaceutics & Lab	30:721:301	4	Introduction to Biopharmaceutics & Pharmacokinetics	30:721:430	4
Foundations of Pharmacy Care	30:725:320	4	iPASS I	30:725:321	3
Professional Elective		2	Professional Elective		2
LEAP Seminar	30:725:304	0	LEAP Seminar	30:725:305	0
16-18			17-19		

Students must complete five professional electives during the six semesters for the first through third professional years. Students in the class of 2018 and later must complete one clinical professional elective.

Summer Term

Class Name	Class No	Credits
Introductory Pharmacy Practice Experience	30:725:330	2

Second Professional Year (P2)

First Term			Second Term		
Class Name	Class No	Credits	Class Name	Class No	Credits
Medicinal Chemistry I	30:715:409	3	Medicinal Chemistry II	30:715:410	3
Pulmonary Pharmacotherapy	30:720:440	2	Renal Pharmacotherapy	30:720:445	2
Hematology Pharmacotherapy	30:720:441	1	Infectious Diseases Pharmacotherapy	30:720:446	4
Cardiology Pharmacotherapy	30:720:442	4	Sterile Compounding	30:725:489	2
Literature Evaluation and Application	30:725:470	2	Pharmacy Practice Management	30:725:308	3
Pharmaceutical Microbiology	30:158:420	3	iPASS III	30:725:433	2
iPASS II	30:725:432	2	Professional Elective		2
LEAP Seminar	30:725:404	0	LEAP Seminar	30:725:405	0
17			16-18		

Summer Term

Class Name	Class No	Credits
Intermediate Pharmacy Practice Experience	30:725:480	2

Third Professional Year (P3)

First Term			Second Term		
Class Name	Class No	Credits	Class Name	Class No	Credits
Endocrine and Reproductive Pharmacotherapy	31:720:540	2	Psychiatric and Behavioral Disorders Pharmacotherapy	31:720:545	2
Gastrointestinal, Hepatic and Nutrition Pharmacotherapy	31:720:541	2	Neurology Pharmacotherapy	31:720:546	3
Oncology Pharmacotherapy	31:720:542	3	Immunology, Ocular, and Dermatology Pharmacotherapy	31:720:547	1
Self Care and Home Care	31:725:550	3	Poison Management and Drug Abuse	30:725:415	3
Principles of Pharmaceutical Economics	30:725:320	3	Pharmacy Law and Bioethics	31:725:545	4
iPASS IV	31:725:534	2	iPASS V	31:725:535	2
Professional Elective		2	Professional Elective		2
LEAP Seminar	30:725:504	0	LEAP Seminar	30:725:505	0
15-17			15-17		

All curriculum requirements of the first five years must be successfully completed before students may register for any Terminal Year rotations.

PharmD Program Working Group

Students need to complete at least (8) experiential rotations during the Terminal Year of the Program. Additional rotations may be completed after consultation with the Director of Professional Experience Program. Note Fourth Professional Year begins in the summer following Spring of the Third Professional year (see below).

Fourth Professional Year (P4)

Summer Term

Class Name	Class No	Credits
Adv. Practice Experience I	31:725:791	5
Adv. Practice Experience II	31:725:792	5
Adv. Practice Experience III	31:725:793	5
		15

First Term

Class Name	Class No	Credits
Adv. Practice Experience IV	31:725:794	5
Adv. Practice Experience V	31:725:795	5
Adv. Practice Experience VI	31:725:796	5
		15

Second Term

Class Name	Class No	Credits
Adv. Practice Experience VII	31:725:797	5
Adv. Practice Experience VIII	31:725:798	5
Adv. Practice Experience IX	31:725:799	5
Student Portfolio	31:725:615	2
Pharmacy Reflection Seminar	31:725:617	2
		19

Note that work on the portfolio begins during the IPPE courses, continues during APPE courses, and is completed and submitted for grading during the final semester of the P4 year.

PharmD Program Working Group

Appendix 4. List of current faculty

Department: Chemical Biology		Zhou, Renping	Chair/Professor I
Cartegni, Luca	Tenure Track Associate Professor	Suh, Nanjoo	Professor I
Chen, Susie	Professor I	Wang, Hong	Asst Research Professor
Furmanski, Philip	Distinguished Professor	Yang, Chung S	Distinguished Professor
Liu, Fang	Associate Professor	Zheng, Xi	Associate Res Professor
Minden, Audrey	Associate Professor	Zong, Wei-Xing	Professor I
Department: Medicinal Chemistry		Hu, Longqin	Chair/Professor I
Augeri, David	Research Professor	LaVoie, Edmond	Professor I
Kimball, David	Research Professor		
Department of Pharmacy Practice and Administration		Sturgill, Marc	Chair/Associate Professor
Adams, Christopher	Clinical Assistant Professor	Mansukhani, Rupal	Clinical Associate Professor
Andrews, Liza	Clinical Associate Professor	Maroney, Megan	Clinical Assistant Professor
Barone, Joseph	Dean/Professor II	Mauri, Michael	Clinical Assistant Professor
Bateman, M. Thomas	Clinical Assistant Professor	McCarthy, Caitlin	Clinical Assistant Professor
Bloom, Caitlyn	Clinical Assistant Professor	Meyers, Rachel	Clinical Associate Professor
Bohnenberger, Kristin	Clinical Assistant Professor	Morales, Enid	Clinical Associate Professor
Bridgeman, Mary	Clinical Associate Professor	Narayanan, Navaneeth	Clinical Assistant Professor
Bridgeman, Patrick	Clinical Assistant Professor	Nerenberg, Steven	Clinical Assistant Professor
Brunetti, Luigi	Associate Professor	Nguyen, May	Clinical Assistant Professor
Brust-Sisti, Lindsay	Clinical Assistant Professor	Opsha, Yekaterina	Clinical Assistant Professor
Cabanas, Greg	Clinical Assistant Professor	Park, Jiyeon	Clinical Assistant Professor
Cardinale, Maria	Clinical Assistant Professor	Patel, Krina	Clinical Assistant Professor
Casias, Michael	Clinical Assistant Professor	Patel, Ammie	Clinical Assistant Professor
Chaudhry, Saira	Clinical Assistant Professor	Patzke, Ciera	Clinical Assistant Professor
Colaizzi, John	Univ Prof (& in Pharmaceutics)	Philips, Ashmi	Clinical Assistant Professor
Dixit, Deepali	Clinical Assistant Professor	Pizzi, Laura	Professor I
Effendi, Muhammad	Clinical Assistant Professor	Robinson, Christine	Clinical Associate Professor
Fahim, Germin	Clinical Assistant Professor	Rossi-George, Alba	Visiting Asst. Research Professor
Gerhard, Tobias	Associate Professor	Saleh, Julie	Clinical Associate Professor
Gonzalez, Jimmy	Clinical Assistant Professor	Shah, Pooja	Clinical Assistant Professor
Hardeo, Stacy	Clinical Assistant Professor	Siu, Anita	Clinical Associate Professor
Hermes-DeSantis, E	Clinical Professor I	Swamy, Siddharth	Clinical Assistant Professor
Jan, Saira	Clinical Professor I	Tompkins, Danielle	Clinical Assistant Professor
Jimenez, Humberto	Clinical Assistant Professor	Toscani, Michael	Research Professor I
Johnston, Jackie	Clinical Assistant Professor	Volino, Lucio	Clinical Associate Professor
Kim, Geeny	Clinical Assistant Professor	Wagner, Mary	Associate Professor
Kimler, Katelin	Clinical Assistant Professor	Wong, Cecilia	Clinical Assistant Professor
Liu, Mei	Clinical Assistant Professor	Wynd, Michael	Clinical Associate Professor
Department: Pharmacology Toxicology		Laskin, Debra	Distinguished Professor/Chair
Aleksunes, Lauren	Associate Professor	Joseph, Laurie	Assistant Research Professor
Chang, Yoke-Chen	Assistant Research Professor	Kong, Bo	Assistant Research Professor
Gardner, Carol	Associate Research Professor	Malaviya, Rama	Assistant Research Professor
Gerecke, Donald	Associate Professor	Molloy, Christopher	Interim Chancellor, Professor II
Gordon, Marion	Associate Professor	Rancourt, Raymond	Asst Research Professor
Gow, Andrew	Associate Professor	Reuhl, Kenneth	Professor I
Guo, Changjiang	Assistant Research Professor	Stapleton, Phoebe	Tenure Track Assistant Professor
Guo, Grace	Associate Professor	Shul, Vasanthi	Associate Research Professor
Ji, Sungchul	Associate Professor	Zhou, Peihong	Assistant Research Professor
Department: Pharmaceutics		Minko, Tamara	Distinguished Professor/Chair
Garbuzenko, Olga	Assistant Research Professor	Michniak-Kohn, Bozena	Professor I
Hatefi, Arash	Associate Professor	Sinko, Patrick	Distinguished Professor
Kagan, Leonid	Assistant Professor	Szekely, Zoltan	Assistant Research Professor
Kong, Ah-Ng	Distinguished Professor	You, Guofeng	Distinguished Professor

Appendix 5. Select PharmD Student Awards, Presentations, and Publications

PharmD Student Awards:

- **Rachel Winner**, 2019 Society of Toxicology Pfizer Undergraduate Award
- **Sumie Kakehi**, 2018 Academy of Managed Care Pharmacy Student Pharmacist Chapter Member of the Year Award
- **Soham Shukla, Nihal Narsipur, Hannah Lee, Brianna Devitt**, 2018, National Semifinalists in the 18th Annual P&T Competition for the Academy of Managed Care Pharmacy
- **NJSHP Student Chapter**, Rutgers University, 2017 ASHP-SSHP Outstanding Professional Development Project Award
- **Barkha Jain**, 2017 American College of Clinical Pharmacy Annual Meeting Best Student Poster Award
- **Arianna Kee**, 2017 Academy of Managed Care Pharmacy Annual Conference, Best Student Pharmacist Poster
- **Nihal Narispar**, 2016 MidAtlantic Pharmacology Poster Award
- **Danielle Tompkins, Alexander Mozeika, Ena Todorovska, Serena Arnouk**, 2015, National first place in the 15th Annual P&T Competition for the Academy of Managed Care Pharmacy
- **Qi Wang**, Rutgers University, 2012 Society of Toxicology Pfizer Undergraduate Award

PharmD Student Presentations:

- Chang D, Mao Y, Rzendzian RB. (2018) An Analysis of Promotional Strategies and Organizations Receiving Enforcement Letters from the Food and Drug Administration (FDA) from 2009 to 2018. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Rusay M, Brunetti L, Doherty N. (2018) Impact of tranexamic acid on thromboembolism risk in orthopedic surgery. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Kwak M, Abazia D, Rojavin Y. (2018) Impact of a multimodal pain management order set on opioid use in an inpatient trauma population. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Cendagorta A, Kimler K. (2018) Retrospective Evaluation of Pain Management Regimens in Patients Utilizing Dinutuximab for Treatment of Neuroblastoma or Osteosarcoma. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Narsipur N, St. John D. (2018) Impact of an Insulin Infusion Dose Limit on Rates of Hypoglycemia and Time to Recovery in the Treatment of Hyperglycemic Crisis. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Abbas K, Ashour J, Toscani M. (2018) Evaluating the role of the pharmacist in chimeric antigen receptor (CAR) T cell therapy. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Keene J, Opsha Y, Howard D, Bente J. (2018) Evaluation of systematic corticosteroid dosing in COPD exacerbation. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Song J, Toscani M. (2018) Antibiotic shortages around the world. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Shertel T, Eisenhart A. (2018) Impact of clinical trial enrollment on renal transplant outcomes. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Kim S, Sanchez S, Brunetti L, Sun N, Nguyen M. (2018) Impact of a bedside pharmacist on tissue plasminogen activator (tPA) door-to-needle time in acute ischemic stroke. ASHP Midyear Clinical Meeting, Anaheim, CA.

- Chow T, Ho B, Fu Q, Toscani M. (2018) Evaluation of the regulatory timeline for oncology products to receive second indications on already approved products. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Shibad R, Bhambhani S, Bernstein W, Wong C, Thé Tiong. (2018) Analysis of Neonatal Hypoglycemia Practices at Saint Peter's University Hospital. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Wang A, Lise J, Malhotra A. (2018) Antimicrobial Prescribing Patterns in Pediatric Community-Acquired Pneumonia. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Tarnawski A, Brunetti L, Allen M, Rodricks M, Adams C. (2018) Evaluating the impact and compliance of a hospital driven Code Sepsis protocol on patient outcomes. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Mehta A, Brunetti L, Wei S, Nguyen. (2018) Short Versus Long Course Intravenous Azithromycin for Community Acquired Pneumonia in Hospitalized Adult Patients. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Hennessy N, Shah P. (2018) Evaluation of buccal glucose gel for the treatment of neonatal hypoglycemia. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Germaske L, Philips A, Madduri R, Varghese M. (2018) Retrospective analysis of dexmedetomidine utilization at a community hospital. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Patel K, Stummer L, Patel K. (2018) Stiff-person syndrome in a patient with comorbid bipolar and panic disorders: a case report and literature review. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Capello Su, Brust-Sisti L, Moreau S. (2018) Survey on patient use and attitude towards proton pump inhibitors (PPIs). ASHP Midyear Clinical Meeting, Anaheim, CA.
- Bezzubik C, Nerenberg S. (2018) Implementation of an emergency department discharge protocol for low-risk venous thromboembolism. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Awad D, Brunetti L. (2018) Comparison of an Antimicrobial Stewardship Decision Tool to Chart Review for the Identification of Inappropriate Piperacillin-tazobactam Prescribing. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Wo S, Cardinale M, Yegneswaran B. (2018) Impact of sedation selection on intensive care unit (ICU) length of stay: a retrospective chart review. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Johnson L, Cavallari J. (2018) Fosphenytoin vs. levetiracetam for seizure prophylaxis. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Wang H, Radparvar S. (2018) Dose comparison of vasopressin in septic shock. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Yoon K, Choi J, Toscani M, Feudo D, Barone J. (2018) Ernest Mario School of Pharmacy (EMSOP) preceptors' perceptions on business mergers and their effect on the profession and patient care. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Yi m, Philips A, Madduri R, Varghese M. (2018) Retrospective analysis of vancomycin dosing and administration in dialysis inpatients at a community teaching hospital. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Patel K, Janjanam S, Toscani M. (2018) HER2 – Negative Breast Cancer Pharmacotherapy: Comparing the NCCN Guidelines and approved FDA labeling. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Hasiotis D, Patel T, Andrews LB. (2018) Effect of 48-hour automatic time out on cefepime duration of therapy. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Noreika S, Major J, Im J, Shin R. (2018) Trends in Refusal to File (RTF) actions from FDA and impact on drug development. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Yuan B, Fu Q, Lieu A, Volino L. (2018) Evaluating the impact of companion diagnostic devices on oncology drug clinical development timeline and FDA approvability. ASHP Midyear Clinical Meeting, Anaheim, CA.

- Lee H, Shibad R, Wagner M. (2018) Evaluation of patient assistance program utilization in a student run clinic: a review of available process streamlining programs. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Oh GC, Siu A. (2018) Atypical Guillain-Barré Syndrome: case report in the pediatric population. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Toscani M, Shukla S, Barone J, Testai J, Reilly E. (2018) SO-ACT: survey of obstacles to the administration of clinical trials. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Cho YW, Shah S, Sturgill M. (2018) Developing and assessing an interprofessional pharmacy student peer-led curriculum for pre-pharmacy college students. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Yang H, SHahat M, Toscani M, Brust-Sisti L. (2018) Introduction to master protocols, innovative clinical trial designs for development of precision oncology drugs. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Amin T, Keegan N, Fahim G. (2018) Opioid consumption in sickle cell pain crisis patients after implementation of multimodal analgesia: a retrospective chart review. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Kang J, McCarthy C, Bateman Jr. MT. (2018) Assessing Student Pharmacists' Clinical Interventions in Advanced Pharmacy Practice Experiences: A Focus on Ambulatory Care. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Mangondato H, Toscani M. (2018) "Pre-workout supplements": a review of the available science for safety and effectiveness. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Lee B, Guo X, Toscani M. (2018) Orphan Drugs: a global regulatory review. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Zhu E, Maroney M, Toscani M. (2018) Five-year analysis of innovation in schizophrenia and bipolar disorder clinical development. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Pesa M, Toscani M. I(2018) mmunologic mechanisms of action of biological antineoplastic agents in phase 3 clinical trials. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Booth E, Jain B, Patel T, Andrews LB. (2018) Evaluation of Vancomycin Use in the Intensive Care Unit Versus Medical Floors in a Community Hospital with Pharmacist Managed Therapeutic Drug Monitoring. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Gupta S, Toscani M. (2018) Interest in pharmacy careers: a pilot student-led seminar to promote the pharmacy profession to STEM students. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Modi M, Bimrah S, Toscani M. (2018) REMS: Potential hurdles impeding generic access to pharmaceutical products. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Mock P, Pathyuri N, Ho L, Vaidya S, Toscani M, Barone J. (2018) Electronic Nicotine Delivery Systems (ENDS): Impact of recent FDA regulations. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Ho B, Virparia R, Toscani M, Barone J. (2018) Analysis of surrogate endpoints as the basis of approval or licensure by therapeutic area and approval pathway. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Patel P, Gutteridge C. (2018) Empowerment of patients: Investigating the accessibility of patient resources from pharmaceutical companies' websites. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Amin T, Keegan N, Fahim G, Mathis A (2018) Evaluation of Opioid Consumption in Sickle Cell Pain Crisis after Implementation of Multimodal Analgesia. MidAtlantic Pharmacology Society, Philadelphia, PA.
- Amin T, Fahim G (2018) Evaluation of Opioid Consumption in Sickle Cell Pain Crisis Patients after Implementation of Multimodal Analgesia: a Retrospective Chart Review. ASHP Midyear Clinical Meeting, Anaheim, CA.
- Jung Y, McCarthy C, Bateman T, McGuigan K, Wagner M. (2016) Pharmacist assisted self-management goal setting: impact on specific, measurable, attainable, relevant, and time-bound (SMART) criteria

on goal attainment in patients with type 2 diabetes mellitus. ASHP Midyear Clinical Meeting. New Orleans, LA.

- Shah M, Maroney M (2016) Impact of Invega Sustenna on Hospital Admissions. NJ Pharmacist Association. Simmons D, McGuigan K, Bateman MT, McCarthy C, Wagner ML. (2016) Psychometric validation of the diabetes knowledge test in Medicaid eligible adults. International Society for Pharmacoeconomics and Outcomes Research 21st Annual International Meeting, Washington, DC
- Narsipur N, Yang CS (2016) Effect of of Phytosterols on NAFLD in High Fat Diet Fed Mice. MidAtlantic Pharmacology Society Meeting. Philadelphia, PA.
- Choi M, Gallo P, Zhou P, Hahn RA, Chang, YC, Gerecke DR, Gordon, MK (2016) Expression of MMP-9 and ADAM17 is Attenuated by Restasis in Corneas Injured by Nitrogen Mustard, American Association of Anatomists regional meeting, New York, NY Girgis S, Wagner ML, Sukumar D, Balachandar S, Mani, R, Sivaraaman K. (2015) A Pilot Study of an Education and Exercise Program to Improve Bone Health in Patients with Epilepsy. American Epilepsy Society Annual Meeting. Philadelphia, PA.
- Patel A, Maroney M, Kim J (2015) An Evaluation of the Appropriateness of Documentation Regarding the Use of Multiple Antipsychotic Medications in an Inpatient Psychiatric Facility. ASHP Midyear Clinical Meeting. Las Vegas, NV. Nanduri A, Wagner ML. (2015) Efficacy of the Project Healthy Bones Program in an Elderly Community. American-Geriatrics-Society Scientific Meeting. National Harbor, MD.
- Liu J, Hossain M, Richardson J. (2014) Pyrethroid Pesticides Directly Activate Microglia through Voltage-Gated Sodium Channels Leading to Increased TNF-Alpha Release. Society of Toxicology Meeting, Phoenix, AZ, Abstract No. 1844.
- Little M, Eldasher L, Wen X, Bircsak K, Yacovino L, Aleksunes L (2013) Induction of Hepatic Bcrp Transporter Expression in Mice Treated with Perfluorooctanoic Acid. Society of Toxicology, San Antonio, TX. Abstract No. 662.
- He L, Johnson S, Myers D, Zhang X, Szekely Z, Sinko P. (2013) Development of Nanoparticles Displaying LyP-1 Peptides for Targeted Cancer Drug Delivery. MidAtlantic Pharmacology Society Meeting, Philadelphia, PA.

PharmD Student Publications:

- Qiu O, Chan T, Luen M, Cruz J, Hermes-DeSantis ER. Use of nitroglycerin ointment to treat primary and secondary Raynaud's phenomenon: a systematic literature review. *Rheumatology International* 2018 Aug 22. doi: 10.1007/s00296-018-4119-9. [Epub ahead of print]
- Nanduri A, Fullman S, Morell L, Buyske, S, Wagner ML. Pilot study for implementing an osteoporosis education and exercise program in an assisted living facility and senior community. *Journal of Applied Gerontology* 2018;37(6)745-762 (October 2016 online version) PMID:27733660 DOI: 10.1177/0733464816672045
- Vishnevetskaya K, Wagner M, Toscani M, Kaes L. Dementia screening tests in New Jersey assisted living facilities. *Geriatric Nursing*. 2017;38(5):466-473
- Hossain MM, Liu J, Richardson JR. Pyrethroid Insecticides Directly Activate Microglia Through Interaction with Voltage-Gated Sodium Channels. *Toxicol Sci*. 2017 Jan;155(1):112-123. doi: 10.1093/toxsci/kfw187. Epub 2016 Sep 21. (SURF 2013.)
- Henderson M, Bragg A, Fahim G, Shah M, Hermes-DeSantis ER. A review of the safety and efficacy of vaccines as prophylaxis for *Clostridium difficile* infections. *Vaccines (Basel)* 2017;5(3): pii. E25 doi:10.3390/vaccines5030025
- Lin Y, Bircsak KM, Gorczyca L, et al. Regulation of the Placental BCRP Transporter by PPAR Gamma. *J Biochem Mol Toxicol*. 2017 May;31(5). doi: 10.1002/jbt.21880. Epub 2016 Nov 23. (SURF 2014.)

- Cruz JE, Ward A, Anthony S, Chang S, Bae H, Hermes-DeSantis ER. Evidence for the use of epoprostenol to treat Raynaud's phenomenon with or without digital ulcers: a review of the literature. *Annals of Pharmacotherapy* 2016. Online 7/26/2016: 1-8 DOI 10.1177/1060028016660324
- Lin L, Swerdel MR, Lazaropoulos MP, et al. Spontaneous ATM Gene Reversion in A-T iPSC to Produce an Isogenic Cell Line. *Stem Cell Reports*. 2015 Dec 8;5(6):1097-1108. doi: 10.1016/j.stemcr.2015.10.010. Epub 2015 Nov 19. (SURF 2015.)
- Muglia C, Kar I, Gong M, Hermes-DeSantis ER, Monteleone C. Anaphylaxis to medications containing meat by-products in an alpha-gal sensitized individual. *The Journal of Allergy and Clinical Immunology: In Practice* 2015;3(5):796-7 DOI: <http://dx.doi.org/10.1016/j.jaip.2015.04.004>
- Kar I, Gong M, Muglia C, Monteleone CA, Hermes-DeSantis ER. Alpha-Gal (Mammalian meat) allergy: Implications for pharmacists. *Pharmacy Times* 2015 May.
- Xiao J, Wang Q, Bircsak KM, et al. In Vitro Screening of Environmental Chemicals Identifies Zearalenone as a Novel Substrate of the Placental BCRP/ABCG2 Transporter. *Toxicol Res (Camb)*. 2015 May 1;4(3):695-706. (SURF 2011.)
- Fedorenko M, Wagner ML, Wu BY. Survey of risk factors for osteoporosis Osteoprotective behaviors among patients with epilepsy. *Epilepsy and Behavior* 2015;45:217-222b.
- Helbo S, Gow AJ, Jamil A, et al. Oxygen-linked S-Nitrosation in Fish Myoglobins: a Cysteine-Specific Tertiary Allosteric Effect. *PLoS One*. 2014 May 30;9(5): e97012. doi: 10.1371/journal.pone.0097012. eCollection 2014. (SURF 2012.)
- Taratular O, Kuzmov A, Shah M, et al. Nanostructured Lipid Carriers as Multifunctional Nanomedicine Platform for Pulmonary Co-Delivery of Anticancer Drugs and siRNA. *J Control Release*. 2013 Nov 10;171(3):349-57. doi: 10.1016/j.jconrel.2013.04.018. Epub 2013 May 3. (SURF 2012.)
- Eldasher LM, Wen X, Little MS, et al. Hepatic and Renal Bcrp Transporter Expression in Mice Treated with Perfluorooctanoic Acid. *Toxicology*. 2013 Apr 5;306:108-13. doi: 10.1016/j.tox.2013.02.009. Epub 2013 Feb 19. (SURF 2011.)
- Saw CL, Yang AY, Cheng DC, et al. Pharmacodynamics of Ginsenosides: Antioxidant Activities, Activation of Nrf2, and Potential Synergistic Effects of Combinations. *Chem Res Toxicol*. 2012 Aug 20;25(8):1574-80. doi: 10.1021/tx2005025. Epub 2012 Aug 9. (SURF 2012.)

Appendix 6. SWOT Analysis

<p>Strengths</p> <ul style="list-style-type: none"> • High-quality students <ul style="list-style-type: none"> • Diverse population • High ratio of applicants to admitted students • Younger students with the ability to develop and mentor them • Two models for admission: 0-6 program and transfer into the first P1 year • Large number of opportunities for students <ul style="list-style-type: none"> • Research opportunities including Honors program, Research electives, Summer research programs, etc. • Electives courses and rotations • Co-curricular opportunities • Dual-degree programs • Interprofessional education • High caliber faculty <ul style="list-style-type: none"> • Many on the Clinical track are co-funded • Total number and diversity of clinical sites based on faculty location in the department of PPA • High ranking of NIH funding • Location of the School in a highly populated region • Teaching facilities now including simulation labs and Sterile Prep lab, assessment rooms, community practice settings • iPASS integrated skills paired w/ therapeutic modules • Industry collaborations • Residency / Fellowship placement rate • Integral part of RBHS • Diverse cadre of preceptors throughout NJ 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Slight decline in NAPLEX passing rate in recent years • Turnover of PPA faculty • Faculty with many obligations to sites / scholarship / students for didactic and experiential teaching • Limited Post-grad training opportunities sponsored by the School • Awareness of advising / wellness support • Bureaucracy of Rutgers • Limited number of clinical faculty with research expertise • Immaturity of students with limited emotional intelligence • Limited ability to market and communicate our successes • Few numbers of formal NJ pharmacy collaborative practice agreements • Limited administrative/instructional support for the PharmD program • Weak mentorship of clinical faculty in research and grantsmanship • Variable preceptor availability for IPPE and APPE Hospital/Institutional rotations
<p>Opportunities</p> <ul style="list-style-type: none"> • Expand the scope of pharmacy practice within NJ • Improve and enhance the recognition of faculty in state-wide health initiatives • Increase the consistency of utilizing the formal Pharmacists' Patient Care Process (PPCP) on all rotations • Consideration of high-stake assessment to determine rotation readiness • Enhance academic, counseling, and disabilities services for students • Develop a more efficient process with University Admissions • Continue to develop additional simulation opportunities in the curriculum for our students and other RBHS students • Increase sponsorship of Post-grad training opportunities • Increasing residency placements • Exploring international opportunities for student rotations and service outreach • Building and enhancing the Rutgers – RWJBH collaboration • Continuing to enhance and grow experiential opportunities for innovative clinical services and teaching • Continuing to build highly interactive didactic classroom instruction 	<p>Threats</p> <ul style="list-style-type: none"> • Lack of legislation to advance the scope of pharmacy practice at both the State and National level • Our NAPLEX scores have not kept pace and advanced as compared to our competitor schools • No provider status recognized federally; however, we are recognized as providers in the State of NJ. But no insurance company have a reimbursement model for pharmacy services • High concentration of pharmacy schools within NJ tri-state area • Job market inadequate for the increasing number of pharmacy graduates due to the increasing number of pharmacy schools and the expansion of current schools • Fluctuating number of clinical sites and availability • Changing business practice in healthcare may negatively impact job opportunities for pharmacists • Lack of consistency in site-to-site expectations of APPE students