

## School of Pharmacy | Graduate School of Pharmaceutical Sciences

### Complementary Tracks Connecting the Pharmaceutical Sciences and Pharmacy Practice: Encouraging Research for PharmD Students

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#### BACKGROUND

Connecting the basic sciences and pharmacy practice is an important curricular goal. Providing such a link for student pharmacists is encouraged by the ACPE, which in the 2016 Guidelines recommends “broadening student experiences” (Std. 9e), and linking “scientific understandings and patient care” (Std. 10d). These links are generally assumed to be the result of all curricula, however, direct efforts to blend science and practice can be helped by establishing formal pathways within a program (e.g., concentrations, certificates, degrees), the implementation of which can benefit from an extant, complementary graduate program. When student pharmacists pursue broader experiences during their pharmacy education, the profession is ultimately enriched as these future professionals head into practice with a more complete perspective.

#### DESCRIPTION

In addition to its PharmD program, the Duquesne University School of Pharmacy offers Masters and Doctoral degrees in pharmaceutics, pharmacology, medicinal chemistry, and the social/administrative sciences through its Graduate School of Pharmaceutical Sciences.

Faculty in the Pharmaceutical, Administrative and Social Sciences Division introduce their own, current basic research throughout the PharmD curriculum. More and more, this piques the interest of professional students, looking to study pharmacy beyond the perceptions with which they entered the program. Student pharmacists seeking volunteer opportunities in research laboratories are encouraged to complete the Research Concentration Certificate, which allows them to couple tailored elective coursework with formal faculty advisement on laboratory projects.

PharmD students enrolled in the Research Concentration may also elect to complete a commensurate Bachelor of Science in Pharmaceutical Sciences (BSPS), which requires them to identify one of the science disciplines and an appropriate faculty mentor, complete research-based independent study in a laboratory, take suitable elective courses in the Graduate School of Pharmaceutical Sciences, and ultimately present their research, both as a formal presentation (through a graduate seminar course), and as a poster or podium at a regional, national, or international scientific meeting. Coupled with dedicated financial support for student pharmacists to travel to these scientific conferences, many PharmD students electing to pursue either the Research Concentration and/or the BSPS degree participate as co-authors in peer-reviewed research articles and abstracts.

#### Curricular Pathways

The current PharmD curriculum allows for 9 crs. of electives in the PYIII year (Fall 3 crs.; Spring 6 crs.). Students often approach Faculty engaged in research to begin lab work during PYI or PYII years. Although some choose to only complete research for credit (formalized as Independent Study Research), students are advised to consider either the Research Concentration (culminating in a certificate of completion) or the Bachelor of Sciences in Pharmaceutical Sciences (BSPS) degree (See Figure 1).

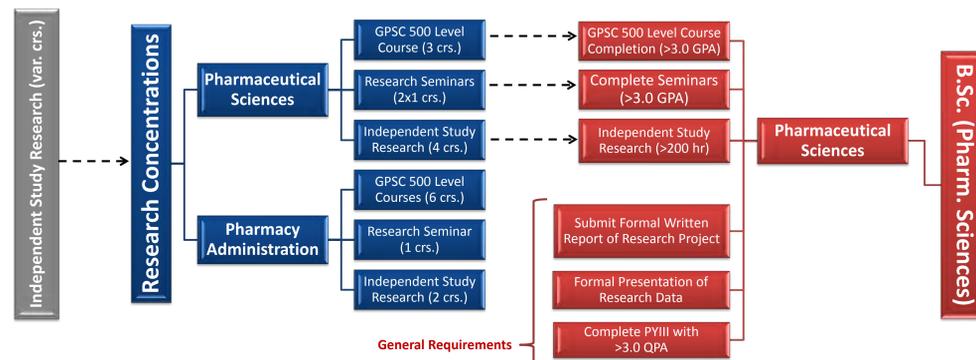


Figure 1. Duquesne School of Pharmacy provides 3 complementary curricular pathways in which students pursue scientific research.

Extant complementary curricular pathways allowing students to pursue research remain elective within Duquesne’s School of Pharmacy. As shown in Figure 2, many students prefer to satisfy elective credit hours by completing Independent Study Research. Additionally, many students complete the requirements for the BSPS degree as they also fulfill the requirements for the Research Concentration. As such, few students choose to complete the Research Concentration option exclusive of the BSPS degree.

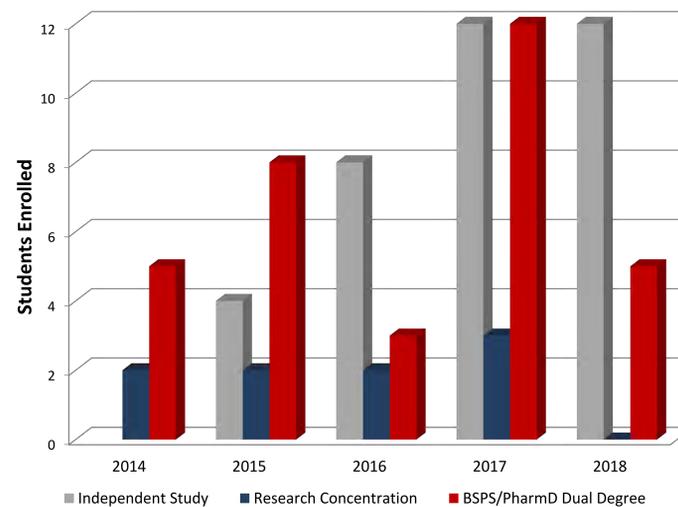


Figure 2. Frequencies at which students have completed each of the 3 complementary curricular pathways for scientific research (inclusive of graduating classes of 2014-2018).

#### ASSESSMENT STRATEGIES

**Independent Study Research:** For-credit projects are formalized using a syllabus, which details gradable content. Normally assessment is conducted by the primary research advisor (faculty) based on observations at group research meetings, and submission of a final report.

**Research Concentration:** GPSC 500 Level and Research Seminar courses are formally established within the Graduate School of Pharmaceutical Sciences. Course syllabi outline course assessment strategies, and PharmD students enroll with Masters and Doctoral degree students. Course selection is done in consultation with the primary research advisor (faculty) based on student interest and course availability. Independent Study Research is evaluated as described above.

**Bachelor of Science (Pharmaceutical Sciences):** GPSC 500 Level and Research Seminar courses must be successfully completed according to Graduate School passing criterion (>3.0 GPA in each). Additionally, students must maintain >3.0 QPA upon completion of the PYIII year, inclusive of PharmD coursework. Research must be submitted as a formal report to the research advisor (often as a precursor to publication) and a formal research presentation must be completed (often as a peer-reviewed poster presentation at a regional, national or international scientific meeting).

	Very High					Very Low				
	5	4	3	2	1	5	4	3	2	1
Q1. How much of an impact do you feel your research experience had on your career goals?	38.46%	30.77%	30.77%	0%	0%					
Q2. How much of an impact did your pharmacy training have on your research experience?	23.08%	38.46%	N/A	30.77%	0%					
Q3. How useful were your research experiences in your pharmacy education?	23.08%	15.38%	53.85%	7.69%	0%					
Q4. Overall, were you satisfied or dissatisfied with your research experience at Duquesne?	69.23%	30.77%	0%	0%	0%					
Q5. How likely are you to continue to participate in research in the future?	69.23%	30.77%	0%	0%	0%					

Table 1. Survey of recent PharmD graduates participating in research experiences in the Duquesne School of Pharmacy (13 respondents).

#### IMPLICATIONS

The three complementary curricular pathways for research in the Duquesne University School of Pharmacy are enabled by pairing PharmD students with research laboratories administered through the Graduate School of Pharmaceutical Sciences. As shown in Table 1, the research experiences are well regarded by students who elect to participate, with more than 2/3 of graduates reporting very high satisfaction and likelihoods of continuing to do research in the future.