THE OHIO STATE UNIVERSITY

College of Pharmacy

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November 20, 2015

Council on Academic Affairs
c/o Office of Academic Affairs
203 Bricker Hall, 190 North Oval Mall
The Ohio State University
CAMPUS

Dear Council on Academic Affairs Members:

I am pleased to submit for your review a proposal for revision of the Doctor of Pharmacy (PharmD) program. The PharmD program has been very successful in attracting highly qualified students since it was first implemented as a graduate professional program in 1998. Since that time, the program has produced 1,445 highly-qualified pharmacy practitioners, supporting our college mission to advance the pharmacy profession and patient-centered care across Ohio and around the globe.

As a Top 10 program, the Ohio State University College of Pharmacy has been a leader in pharmacy education throughout its 130-year history. We have had the privilege of training extremely capable practitioners who have served in a wide array of practice settings. We wish to maintain this tradition by continuing to provide our students with excellent preparation for the future of pharmacy practice, preparing them to be successful in an increasingly competitive job market. We wish to strengthen our position as pharmacy educators in the midst of changing demands within higher education, and we wish to continue to uphold the tradition of leadership embodied by the Ohio State University's mission, vision and values. We believe this proposed curricular revision will help us realize these goals.

The proposed curriculum employs an innovative, modular format designed by our faculty to enable better and more sustained integration of our didactic, laboratory and experiential components. The new curriculum will introduce students to clinical skills at a much earlier point in their studies, allowing them opportunities for hands-on experience applying the knowledge and skills they learn right from the beginning of the program. Students will attain a broader base of learning and through the curriculum's increased focus on deep learning and application.

We included the revision of the program in our strategic plan, and have considered the necessary resources to further enhance an already successful program. We appreciate your consideration of the proposal, which I very strongly endorse.

Sincerely,

Henry J. Mann

Henry J. Mann, Pharm.D., FCCP, FCCM, FASHP
Dean and Professor
College of Pharmacy

Proposal for a Revision of the

Doctor of Pharmacy Degree Program

The Ohio State University College of Pharmacy

Executive Summary

Herein, we propose to significantly revise the College of Pharmacy's Doctor of Pharmacy (PharmD) degree program. We will describe changes in the program's prerequisites, framework, degree requirements, and course plans, providing rationale and supporting data for these modifications. Hallmarks of the proposed revision include integrated delivery of content both within and between modules to help students understand critical connections between subjects, more time for elective course work, and more time for application and simulation.

This revision was presented to the faculty at multiple monthly faculty meetings during the time period of September 2014 through November 2015. Approval of the program structure occurred on March 6, 2015 and approval of the prerequisites on November 17, 2015.

Background

Historical Context

Founded in 1885, the College of Pharmacy at Ohio State University has been a leader in developing and educating pharmacists. Ohio State was one of the earliest public colleges of pharmacy and is also proud of other firsts, including educating women, students of color and foreign-born students. Ohio State was the first College of Pharmacy to require a three-year Graduate in Pharmacy degree in 1886, the first to require a four-year bachelor's degree in 1925, and the first to require a five-year bachelor's degree in 1948. We implemented the Doctor of Pharmacy (PharmD) degree in 1998.

Compared with its predecessor Bachelor of Science degree, the PharmD curriculum offered two major enhancements. First, the curriculum emphasized greater coverage of pharmacology and therapeutics content and second, it dramatically increased the amount of practical or experiential training from one quarter to one year of full-time training plus an additional 300 hours of early practical training beginning in the first year. The revision proposed here capitalizes on our rich tradition of curricular innovation.

The Current Curriculum

As a four-year post-baccalaureate professional degree, the current PharmD program emphasizes the role of the pharmacist in patient care and prepares student pharmacists to become integral parts of the interprofessional health care team. Successful completion of the program enables students to sit for licensure as pharmacists. Students are admitted to the PharmD program on a competitive basis. They progress through the degree in cohorts of approximately 120-130 students, following a structured scheduling plan. The didactic portion of the curriculum culminates in a Capstone experience, which is followed by the start of advanced practice rotations.

The program is designed to balance didactic with experiential learning. During the first three years (P1-P3), students complete 81.5 semester hours of coursework that introduces and reinforces the pharmaceutical sciences, therapeutics, and pharmacy administration content essential to entry-level pharmacy practice. Alongside didactic coursework in the first three years, students also complete 12

semester hours in our pharmacy practice lab and introductory pharmacy practice rotations. These rotations take place in community pharmacy, hospital pharmacy, and a variety of other practice settings to provide students with an opportunity to apply learning from the didactic curriculum in real-world settings. Application of knowledge and skills introduced through introductory practice experiences becomes the focus of the fourth (P4) year of the current program, which requires students to complete 29.5 semester hours, including Capstone and advanced pharmacy practice rotations. Advanced rotations consist of a minimum of nine month-long, 40-hour-per-week rotations in multiple practice settings, including two elective experiences.

Admission Requirements and Selection Process

Currently, prospective students must complete a bachelor's degree in the field of their choice, along with prerequisite courses in essential math and science areas (general biology, general chemistry, organic chemistry, physics, microbiology, anatomy, calculus and statistics) in order to be considered for admission to the PharmD program. Applicants also must complete the Pharmacy College Admission Test (PCAT) with scores in the 50th percentile or higher, and have at least a 2.7 cumulative grade point average. Test of English as a Foreign Language (TOEFL) or Michigan English Language Assessment Battery (MELAB) scores are required for applicants whose first language is not English.

Applicants to the program are reviewed by the College of Pharmacy's Admissions Committee, which includes college faculty, staff, and practicing pharmacists. Academic performance, PCAT scores, work and extracurricular experiences are considered, as are English language proficiency, letters of reference and personal interviews. Admissions are completed on a rolling basis each year.

Current Curriculum Structure and Organization

Consistently rated by *U.S. News and World Report* as one of the top-ten pharmacy programs in the United States, the current PharmD curriculum has maintained essentially the same structure since its inception in 1998. Incremental revisions, the most significant occurring during the quarter-to-semester conversion in 2012, have enhanced the program but left its primary structure unchanged. The current curriculum requires students to complete 129 credit hours, including six hours of electives, distributed over ten academic terms for graduation with the Doctor of Pharmacy.

A breakdown of courses by professional year includes:

First Professional (P1)Year Coursework includes foundational pharmaceutical sciences, Pharmacy Practice I and II (designed to orient students to the profession), and part-time experience in community pharmacy settings through Introductory Pharmacy Practice Experience rotations.	**33.5 semester hours**
Second Professional (P2) Year Coursework includes Clinical Pharmacokinetics, first and second courses in Pharmacology and Therapeutics, Professional Practice Laboratory courses, and Introductory Pharmacy Practice Experiences in hospital settings.	**31.0 semester hours**
Third Professional (P3) Year Coursework includes Clinical Pharmacogenomics, third and fourth Pharmacology and Therapeutics courses, Nonprescription Therapeutics, Pharmacy Practice Management, and Pharmaceutical Jurisprudence. Introductory Pharmacy Practice Experience continues, with part-time placements in varied pharmacy settings. Third professional year courses end with a four-week Capstone course.	**30.0 semester hours**

Fourth Professional (P4) Year The fourth professional year consists of nine one-month Advanced Pharmacy Practice Experience rotations completed during a 10-month time frame, from June-April of the fourth year.	**28.5 semester hours**
Elective Hours Elective hours are selected from an approved list in consultation with faculty advisors and may be completed during any year of the program.	**6.0 semester hours**

Additional information about the structure and course requirements for the current program, including course descriptions and a curriculum layout, can be found in Appendix I of this document**.**

The Current Program's Learning Goals

Graduates of the PharmD program are expected to be able to deliver pharmaceutical care at a level of competence consistent with entry-level practitioners. To enable students' development of the appropriate knowledge, skills and attitudes necessary to practice as generalist, entry-level pharmacists delivering high-quality pharmaceutical care, College of Pharmacy faculty have developed a list of 100 ability-based outcomes concentrated within three broad learning goals.[1]

By the conclusion of the current program, graduates are expected to be able to:

1. *Provide population-based and patient-specific pharmaceutical care.* Seventy-six individual ability-based outcomes contribute to this goal, including developing and implementing population-specific pharmaceutical care programs, providing patient-specific pharmaceutical care, and assuring the safe and accurate dispensing of medications.

2. *Manage and use resources of the health care system.* Twenty-two ability-based outcomes articulate this goal, which includes the ability to prevent and manage problems, the ability to manage resources, and the ability to manage medication use systems.

3. *Promote health improvement, wellness, and disease prevention.* Two outcomes focus on this goal, including the ability to assure the availability of effective public health and disease prevention services related to pharmaceutical care and the ability to develop health policy related to pharmaceutical care.

Continuing Strength of Enrollment

Despite a near doubling in the number of PharmD programs in Ohio in recent years, interest in attending Ohio State's program has remained strong during its 17-year history. Our largest-ever class of incoming pharmacy students enrolled in Autumn 2015. As Table 1 illustrates, our past five admissions cycles have demonstrated that the program continues to attract strong students, many of whom cite the reputation of the Ohio State College of Pharmacy as one of the primary reasons for their interest in applying to the program.[2]

[1] A complete listing of all 100 ability-based outcomes for the current curriculum is available from the College of Pharmacy upon request.

[2] Data obtained through annual survey of admitted students, conducted by the College of Pharmacy's Office of Teaching, Learning and Assessment. The survey has been conducted with students who accepted and declined offers of admission since 2010.

Table 1: Admissions Statistics, Ohio State University Doctor of Pharmacy, 2011-2015

Cohort Entering Autumn	Applications	Offers Made	Enrolled	Average Age Enrolled	Average GPA Enrolled	Average Math/Science GPA Enrolled	Average PCAT Score Enrolled
2011	774	197	125	24	3.48	3.33	76
2012	622	174	129	24	3.54	3.41	79.32
2013	655	225	123	23	3.54	3.40	83.14
2014	676	206	122	22	3.52	3.39	84.7
2015	687	192	143	23	3.40	3.30	80

Student Satisfaction with the Doctor of Pharmacy Program

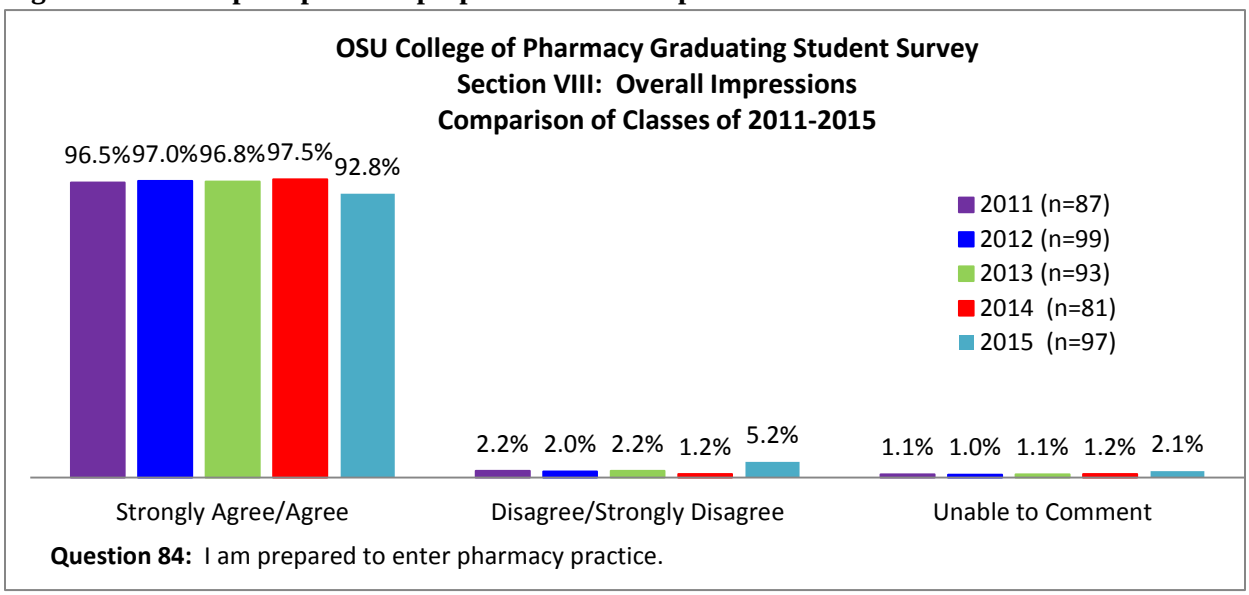
The College of Pharmacy has consistently sought feedback from its students regarding their levels of satisfaction with the PharmD curriculum. Data have been collected from students at varying points in their experience, most notably from graduating students each spring semester. As required by the Accreditation Council for Pharmacy Education (ACPE), graduating students are invited to respond to a Curriculum Quality Survey administered by the American Association of Colleges of Pharmacy (AACP) between March and June each year. Feedback obtained through this instrument is reviewed by college administrators and the PharmD Program Committee, who use results from this survey in concert with other feedback to identify areas of concern in the curriculum and to formulate responses to those concerns.

The AACP Graduating Student Survey is an 87-item multiple choice survey instrument, which asks students to rate their levels of agreement on items related to

- interprofessional education
- professional competencies and outcomes
- the Doctor of Pharmacy curriculum
- pharmacy practice experiences
- student services
- the student experience
- facilities, experiential sites and educational resources, and
- overall impressions.

The last category, overall impressions, invites students to share their level of satisfaction with their experience as pharmacy students, and asks them to rate their preparedness to enter practice. As Figure 1 indicates, Ohio State respondents since 2011 have consistently reported high levels of agreement/strong agreement (> 92%) when asked if they felt prepared to enter pharmacy practice.

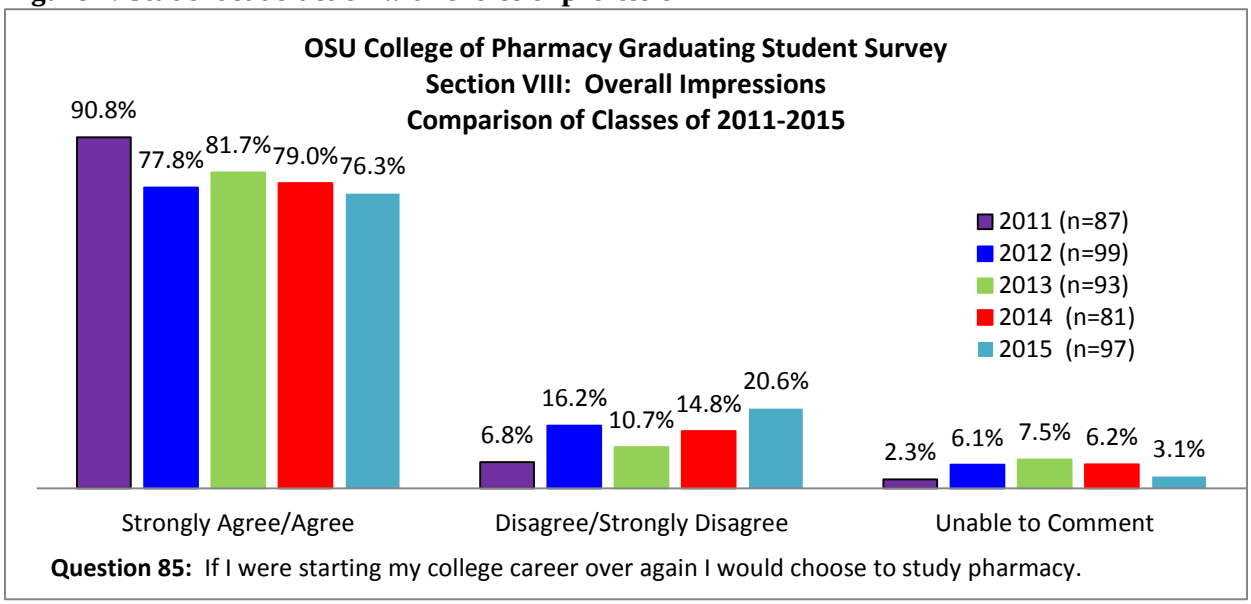
Figure 1: Student perceptions of preparation to enter profession



However, when asked whether they would choose to study pharmacy again, whether they would choose to study at the same college or school of pharmacy again, and whether they would recommend a career in pharmacy to a family member or friend, survey respondents have reported declining levels of agreement/strong agreement since 2011. Corresponding levels of disagreement/strong disagreement have increased in that same time frame.

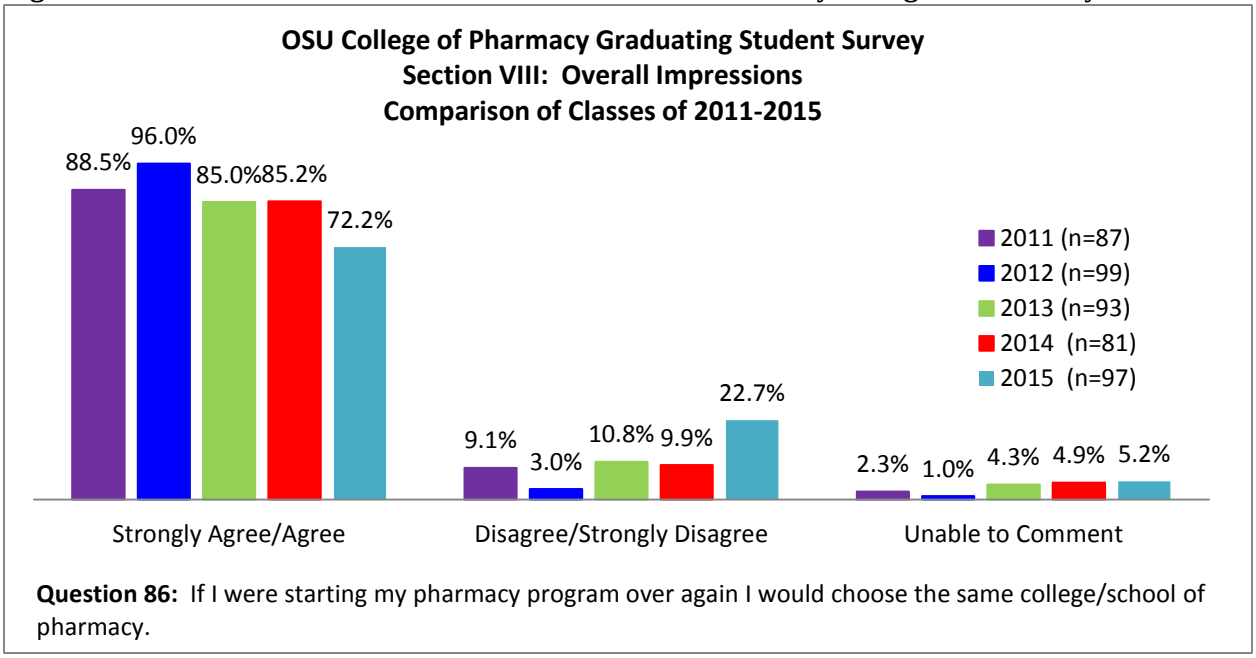
On the choice of pharmacy as a profession, 14.5% fewer respondents in 2015 expressed agreement/strong agreement than in 2011.

Figure 2: Student satisfaction with choice of profession



Similarly, the percentage of respondents agreeing or strongly agreeing that they would choose the same college/school of pharmacy if they were starting their programs over again also declined, with 16.3% fewer 2015 respondents expressing agreement than in 2011.

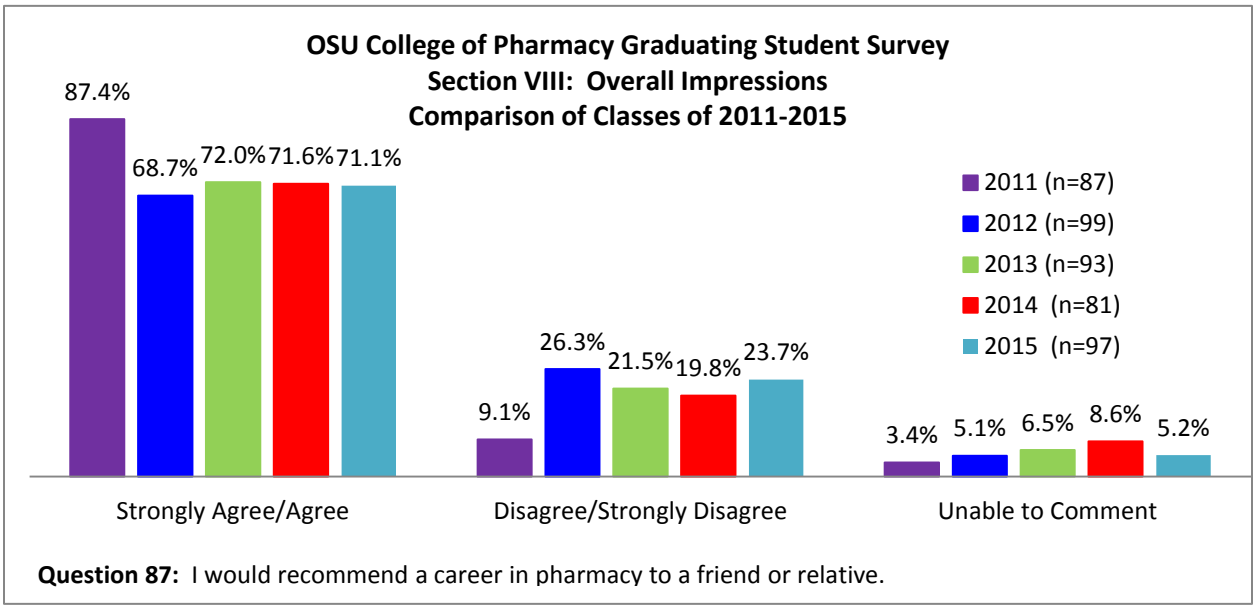
Figure 3: Student satisfaction with choice of Ohio State University College of Pharmacy



Question 86: If I were starting my pharmacy program over again I would choose the same college/school of pharmacy.

The same percentage difference appears when comparing the proportion of 2015 vs. 2011 respondents agreeing/strongly agreeing that they would recommend a career in pharmacy to their friend or relative.

Figure 4: Student recommendation of careers in pharmacy



Question 87: I would recommend a career in pharmacy to a friend or relative.

In sum, Ohio State University Doctor of Pharmacy students studying in the current curriculum are feeling prepared to enter practice, but their overall satisfaction with the profession and with choosing to study in the Ohio State University College of Pharmacy has dropped by an average of 15.7% when comparing the Class of 2011 with the Class of 2015.

Student Reaction to the Current Curriculum

When looking more specifically at how graduating students since 2011 have viewed their experience with the current curriculum, survey results from the AACP Graduating Student Survey indicate that while Ohio State students have a positive opinion of the curriculum as a whole, levels of agreement and strong agreement have declined on several curriculum-related items in recent years. Comparing Ohio State pharmacy graduates' responses from the 2011-2015 surveys, eight items reflected either an average level of agreement below 70% or a negative difference of more than 10% when contrasting 2011 and 2015 levels of agreement.[3] Mapped to current ACPE standards, these items fall into the categories of Professional Competencies and Outcome Expectations; Curricular Development, Delivery and Improvement; and Curricular Core – Pharmacy Practice Experiences.[4] Trends in reported levels of agreement/strong agreement for these eight items are summarized in Table 2, below.

Table 2: Levels of Agreement, Selected Items, Graduating Student Surveys, 2011-15 Ohio State Responses

	2011 (n=87)	2012 (n=99)	2013 (n=93)	2014 (n=81)	2015 (n=97)	Weighted Average A/SA	Difference between 2011& 2015
The PharmD Program prepared me to work with the health care team to implement the patient care plan.	94.2%	96.0%	92.5%	87.7%	79.4%	90.0%	-14.8%
The PharmD Program prepared me to interpret epidemiologic data relevant to specific diseases and their management.	89.6%	90.9%	80.6%	77.8%	78.4%	83.6%	-11.2%
The PharmD Program prepared me to interpret economic data relevant to treatment of disease.	79.3%	78.8%	68.8%	67.9%	54.6%	69.8%	-24.7%
The PharmD Program prepared me to work with other stakeholders (e.g., patients and other health professionals) to engender a team approach to assure appropriate use of health care resources in providing patient care.	93.1%	92.9%	92.4%	88.9%	79.4%	89.3%	-13.7%
The PharmD Program prepared me to practice pharmacy in interprofessional and collaborative practice settings.	96.6%	95.9%	92.5%	92.6%	84.5%	92.3%	-12.1%
The sequence of courses was appropriate to build my knowledge and skills.	88.5%	93.0%	87.1%	80.2%	75.3%	84.8%	-13.2%
My introductory pharmacy practice experiences were valuable in helping me to prepare for my advanced pharmacy practice experiences.	62.0%	81.9%	65.6%	60.5%	56.7%	65.7%	-5.30%
My introductory pharmacy practice experiences permitted my involvement in direct patient care	64.4%	85.8%	64.5%	60.5%	70.1%	69.6%	+5.7%

[3] Weighted averages were used in this analysis.

[4] Plaza CM, Patton JM, Kelley KA, Taylor DA. Principles of Good Use for the AACP Curriculum Quality Perception Surveys. American Association of Colleges of Pharmacy; Alexandria, VA: 2014. Available at: www.aacp.org.

	2011 (n=87)	2012 (n=99)	2013 (n=93)	2014 (n=81)	2015 (n=97)	Weighted Average A/SA	Difference between 2011& 2015
responsibilities in both community and institutional settings.							

We can also see lower rates of agreement on a similar array of curriculum-related items when we compare Ohio State responses to those of pharmacy students attending Committee on Institutional Cooperation (CIC)-member institutions and ACPE-member colleges/schools of pharmacy nationwide.[5] Table 3 includes items for which Ohio State respondents recorded levels of agreement at least 10% lower than those of respondents from the CIC and/or ACPE cohorts.[6]

Table 3: Levels of Agreement, Selected Items Illustrating Areas for Improvement, 2015 Graduating Student Survey, Comparison of Ohio State, CIC and National Responses

	Ohio State (n=97)	CIC Peers (n=983)	ACPE colleges/ schools (n=10,093)
The sequence of courses was appropriate to build my knowledge and skills.	75.3%	86%	88.9%
The PharmD Program prepared me to work with the health care team to implement the patient care plan.	79.4%	93.3%	94.6%
The PharmD Program prepared me to interpret economic data relevant to treatment of disease.	54.6%	75.1%	80.0%
The PharmD Program prepared me to work with other stakeholders (e.g., patients and other health professionals) to engender a team approach to assure appropriate use of health care resources in providing patient care.	79.4%	92.0%	92.6%
The PharmD Program prepared me to interpret and apply drug use policy and health policy.	77.3%	87.3%	90.2%
The PharmD Program prepared me to practice pharmacy in interprofessional and collaborative practice settings.	84.5%	95.2%	96.0%
My introductory pharmacy practice experiences were valuable in helping me to prepare for my advanced pharmacy practice experiences.	56.7%	77.1%	82.8%
The PharmD Program prepared me to interpret epidemiologic data relevant to specific diseases and their management.	78.4%	86.1%	89.2%
My introductory pharmacy practice experiences permitted my involvement in direct patient care responsibilities in both community and institutional settings.	70.1%	76.8%	83.3%

Although responses to individual survey items can and do vary from year to year and cohort to cohort, levels of agreement reported for items in Tables 2 and 3 point to areas in which our students are feeling less confident than similar students in other colleges and schools of pharmacy. While overall satisfaction with the program remains strong, and while admissions rates and enrollment continue to be indicators of Ohio State's outstanding reputation among prospective students, students at the center of the educational experience in the College of Pharmacy are telling us that we can do better.

[5]2015 CIC peers institutions included Purdue University, Rutgers, the University of Iowa, the University of Illinois at Chicago, University of Maryland, University of Michigan, University of Minnesota, University of Nebraska-Lincoln, and University of Wisconsin-Madison.

[6] A full listing of responses to all curriculum-related items on the AACP Graduating Student Survey may be found in Appendix II.

Rationale for Curricular Revision

The current PharmD program is ranked as one of the strongest in the United States and provides extremely capable practitioners in a wide array of settings across the nation. In an effort to maintain our strong position among such programs in the midst of changing demands both within higher education and in the pharmacy job market, we believe a curricular revision is required for the following reasons:

- Many students in the current PharmD program have gaps in their knowledge, skills, attitudes, or abilities, and there is substantial variability in students' performance.
- There are significant gaps between our current program's learning outcomes and the new Center for the Advancement of Pharmacy Education (CAPE) Educational Outcomes 2013 and the 2016 ACPE Accreditation Standards.
- The structure and predominant teaching/learning/assessment strategies of the current PharmD program are inefficient and suboptimal for achieving the desired learning outcomes.
- The current PharmD program provides the typical student little opportunity to pursue areas of interest within pharmacy.
- A typical student/graduate of our current PharmD program is not distinguished in any way compared to students/graduates of other programs.
- The current "medication use system" in the U.S. is not meeting the need for appropriate, safe, effective drug therapy.

The creation and implementation of a contemporary curriculum that systematically addresses these problems is critical in an era of increasing competition for the top students amidst a decreasing number of applicants, and an ever-tightening job market.

The Curricular Revision Proposal

Changing the framework from courses to modules

The proposed revision restructures the program by shifting from a traditional course structure model to a modular framework. The current model presents three key issues that necessitate a change in format:

Key Issue #1: The vast majority of pharmaceutical science coursework is taught in the first year of the program whereas the clinical science coursework is interspersed over P2 and P3 years.

Key Issue #2: The current course model divorces the didactic and experiential learning components of the program in a way that acts as a barrier to optimal student learning.

Key Issue #3: The current course model is structured in such a way that it actually encourages students to "sacrifice" certain examinations in order to study for others.

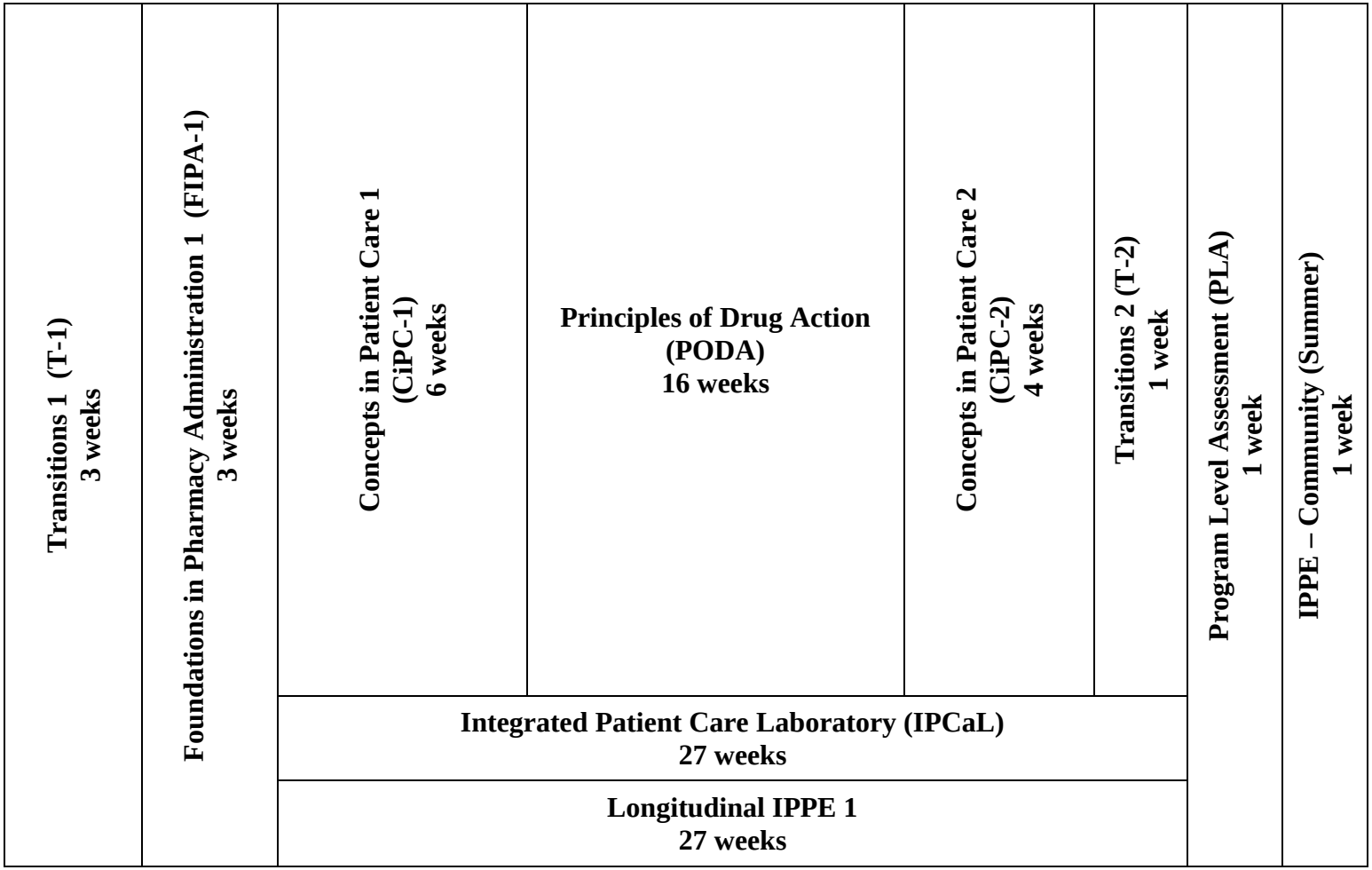
Moving to a modular format allows for better integration and application of pharmaceutical and clinical sciences, as well as didactic, laboratory, and experiential learning components, from the very beginning of the program. Students will learn basic pharmaceutical sciences and apply those concepts in the laboratory module in the first year. Not only will this increase the students' ability to apply pharmaceutical science knowledge in practical laboratory settings, it will reinforce the importance of understanding scientific concepts from the didactic component of the modules. Concepts in patient care will be taught in the first year, establishing a knowledge-base for students to apply in experiential settings as well. Finally, by

allowing students to focus on one didactic module at a time (as opposed to five or more distinct courses), the module framework facilitates deep learning and reduces the need for students to divide their attention between multiple subjects and prioritize the study of some subjects over others. This results in a broader base of learning than the current model provides (i.e. fewer gaps in student's knowledge base), promoting greater long term recall.

The proposed overall structure of the first three years of the curriculum is presented in a series of three diagrams below, including the proposed modules and their location in the curriculum. The final year is comprised of advanced pharmacy practice experience rotations.

The proposed curriculum includes seven modules: Transitions (T), Foundations in Pharmacy Administration (FIPA), Concepts in Patient Care (CiPC), Principles of Drug Action (PODA), Integrated Pharmacotherapy (IP), Integrated Patient Care Laboratory (IPCaL), and Experiential (IPPE and APPE). In some cases, these modules are divided into several submodules that permit delivery of different parts of the module's content at the appropriate times in the curriculum. For example, the Transitions module is divided into four sub-modules, T1 at the beginning of the program, T2 near the end of the P1 year, T3 at the end of the P3 year, and T4 at the end of the P4 year.

Proposed Overall Structure for PharmD Curriculum P1 Year



Proposed Overall Structure for PharmD Curriculum: P2 Year

<table>
<tr><td rowspan="2">CiPC-3</td><td>Integrated Pharmacotherapy (IP)</td><td rowspan="4">Program Level Assessment (PLA)</td><td rowspan="4">IPPE – Hospital (Summer)</td></tr>
<tr><td colspan="2">IPCaL</td></tr>
<tr><td colspan="2">Longitudinal IPPE 2</td></tr>
<tr><td colspan="2">Personalized Electives</td></tr>
</table>

Integrated Pharmacotherapy modules covered in the second year include: Cardiovascular, Renal, Endocrine, Immunology, Pulmonary, and Infectious Disease 1.

Proposed Overall Structure for PharmD Curriculum: P3 Year

<table>
<tr><td rowspan="3">CiPC-4</td><td rowspan="3">Foundations in Pharmacy Administration-2</td><td rowspan="3">Integrated Pharmacotherapy (IP)</td><td rowspan="3">Foundations in Pharmacy Administration-3</td><td rowspan="4">Program Level Assessment (PLA)</td><td rowspan="4">T-3</td></tr>
<tr></tr>
<tr></tr>
<tr><td colspan="4">IPCaL</td></tr>
<tr><td colspan="5">Longitudinal IPPE 3</td></tr>
<tr><td colspan="5">Personalized Electives</td></tr>
</table>

Integrated Pharmacotherapy modules covered in the third year include: Advanced Self Care, Musculo-skeletal, Neuro/Psych, Gastrointestinal/Genitourinary, Infectious Disease 2, Oncology, Hematology, Special Populations, and a Miscellaneous module.

Appendix II provides a program-level description of each proposed module which includes course goals, learning outcomes, and content descriptions. Each module has an assigned duration and is defined in terms of "total student time." Total student time (TST) is defined as the total number of hours the typical student is expected to devote to the professional program each week. TST includes time spent preparing for class, time in class, time studying module content, and time spent completing experiential rotations. It explicitly does not include time devoted to co-curricular activities or time spent working as a pharmacy intern or another capacity. The typical PharmD student is expected to devote about 50 hours to the professional program each week. This will usually include 44 hours during the week and four to eight hours on weekends.

Amending the Program's Learning Goals

Given the gaps between the current program's learning outcomes and the CAPE Educational Outcomes 2013 and the 2016 ACPE Accreditation Standards, we propose a revision of the program's learning goals to better reflect the desired outcomes of the updated curriculum. In Autumn 2014, the faculty of the College of Pharmacy affirmed a vision which states that "Graduates of The Ohio State University Doctor of Pharmacy program will be exemplary patient care providers who serve as the responsible medication experts in the health care delivery system. They will be exceptionally well prepared for entry-level pharmacy practice and advanced pharmacy education." In order to achieve this vision, the Ohio State University Doctor of Pharmacy program will:

- actively engage students in obtaining a world-class professional education in collaboration with the College of Pharmacy's faculty and educational partners,
- help students develop the attitudes and behaviors, knowledge, component skills, and abilities required to become exemplary pharmacists,
- help students develop the ability to identify, prioritize, and solve real-world patient and medication use system problems,
- encourage the pursuit of excellence, including a spirit of inquiry and innovation,
- encourage each student to personalize their education by selecting elective curricular and co-curricular activities based on career goals,
- employ contemporary, evidence-based teaching and assessment strategies in ways that optimize student learning outcomes,
- consciously create a culture and learning environments that enhance student learning, and
- foster each student's personal and professional development, including their professional identity and professionalism.

Using these guiding principles, six learning goals were generated for the program. These goals are consistent with current draft ACPE accreditation standards, as well as other professional standards, guidelines, and codes, and provide a solid basis for curricular design and both student and program assessment. Table 4 maps each of these goals to the proposed modules.

Goal 1. Attitudes and behaviors - The graduate will exemplify the attitudes and behaviors of a professional health care provider.

Goal 2. Knowledge - The graduate will possess the knowledge that is required for exemplary pharmacy practice, including a comprehensive understanding of drugs and the determinants of drug action.

Goal 3. Component Skills - The graduate will possess the skills that are essential components of exemplary pharmacy practice.
Goal 4. Problem-solving ability - The graduate will use a systematic process to identify and seek optimal solutions for patient and medication use system problems.
Goal 5. Providing direct patient care - The graduate will be able to provide exemplary medication-related patient-centered and population-based care, including care related to disease prevention and health promotion, acute illness or injury, chronic disease, and transitions of care.
Goal 6. Managing the medication use system - The graduate will be able to effectively contribute to the management of the human, physical, technological, and financial resources of the medication use system within which they practice to help assure the safety, effectiveness, efficiency, and cost-effectiveness of that system in meeting patient health care needs.

Table 4: Curricular Map

	Transitions	FiPA	CIPC	PoDA	IP	IPCAL	IPPE
Attitudes and Behaviors	✓	✓	✓	✓	✓	✓	✓
Knowledge		✓	✓	✓	✓	✓	✓
Component Skills			✓	✓	✓	✓	✓
Problem-solving Ability	✓	✓	✓	✓	✓	✓	✓
Providing Direct Patient Care			✓		✓	✓	✓
Managing the Medication Use System		✓	✓		✓	✓	✓

Integrating student-centered pedagogy and active learning principles
In order to accomplish these goals, the new curriculum will reflect a greater emphasis on student-centered, application-based learning. Studies have found that there is significant evidence that application-based learning and integrated curricular learning have positive effects on aspects such as teamwork, personal well-being, communication skills, later self-perception, satisfaction with learning environments, patient interactions, dealing with ethical aspects, relating to diverse patient populations, self-reflectiveness, critical thinking, and metacognitive awareness. These skills are consistent with the new ACPE standards and the program's guiding principles and are vital for practicing pharmacists. Additionally, the PharmD program aims to provide learning experiences that enable students to develop the ability to identify, prioritize, and solve patient-care-related problems. This problem-solving ability includes the ability to integrate and apply attitudes and behaviors, knowledge, and skills to patient care, as well as the ability to think critically and creatively, and to make good decisions. For adult learners, active participation in learning results not only in

better long-term recall and synthesis than learning with verbal instruction only, but in greater development of problem-solving skills as well.

The new curriculum will focus on developing this comprehensive problem-solving ability through increasing the incorporation of active learning strategies in the classroom as well as integrating practical experiences much earlier in the program. Additionally, while the current curricular model is fairly limited with respect to personalization, the new model will allow for more elective time in order to give students greater freedom to pursue their individual academic interests. Specific changes include the following:

- Increased use of case studies (active and applied learning) that combine practice elements with basic science concepts of all disciplines (biochemistry, medicinal chemistry, pharmaceutics, pharmacology), jointly taught by faculty from all four disciplines.
- Improved knowledge-based support of student experiential learning by teaching critical concepts in patient care earlier in the curriculum (e.g. OTC, self-care, top 200 drugs, and pharmacy calculation in the first year).
- More exposure to interprofessional and integrated health care experiences earlier in the curriculum.
- Integrated Patient Care Lab over three years, starting in the first semester of the first year.
- Extended number of electives to facilitate personalization of education.

Revise program prerequisites

As part of the curricular revision, faculty reconsidered the program prerequisites in order to determine if the current requirements should be maintained. The existing course prerequisites are as follows:

Table 5: Current program prerequisites

General Requirement Description	Ohio State Course Number
Human Anatomy/lab	Anatomy 2300 or 3300 or EEOB 2510
Introductory Biology/lab	Biology 1113
General Chemistry/lab	Chemistry 1210-1220
Organic Chemistry/lab	Chemistry 2510, 2520, 2540, and 2550
Calculus	Math 1151
Statistics	Statistics 1450 or 1350
Basic Microbiology/lab	Microbiology 4000
Physics/lab (regular or calculus based)	Physics 1200-1201

Following a substantial review process, the faculty of the College of Pharmacy have proposed the following update to the prerequisite requirements for admission into the PharmD program at Ohio State:

- retain all of the previous prerequisite courses **with the exception of Physics 1201**
- add EEOB 2520 Physiology
- add PHR 3200 Biochemistry for the Pharmaceutical Sciences

In addition to these changes, the College of Pharmacy is in the initial stages of developing a comprehensive plan for addressing access and affordability in the PharmD program. One of the options that the College of Pharmacy will consider is establishing a dual BSPS/PharmD degree for Ohio State students.

Program-Level Assessment

The current model of assessment is less than adequate at measuring student achievement of learning objectives and program goals. Students in the program take exams in individual courses, but there is sometimes little obvious connection for students between the key content assessed in individual courses, or between an individual course and program goals and outcomes. Additionally, as noted above, given a rigorous exam schedule throughout the term, students often end up making tough choices about "sacrificing" study for a particular exam in an attempt to balance their obligations. While College of Pharmacy faculty have taken significant steps to ensure that exams are as evenly distributed over the term as possible, the negative effects of this practice of content "sacrifice" are impossible to completely escape under the current curricular model.

Under the new model, students will be focused on only one to three didactic modules at a time, largely eliminating competition between exams. Additionally, each year of the program contains a program-level assessment period which will give students key performance feedback, enabling them to adequately plan the next phase of their academic program. The intent is to assess student competence prior to intensive practical learning and to allow for more complete formative assessments of learning in the program as a whole.

Comparative data

There are currently 135 Doctor of Pharmacy programs in the United States, all of which are subject to accreditation by ACPE as this is the accrediting body for all PharmD programs. Accreditation is required in order for students to sit for licensure as a pharmacist in the U.S. (a list of current programs is available at www.acpe-accredit.org). Among these programs, Ohio State is currently ranked 7th in the nation by *U.S. News and World Report*. Across the nation, top pharmacy schools like the University of North Carolina, University of Minnesota, and the University of Michigan are revamping their curricula in an effort to maintain a competitive advantage and better prepare future pharmacists for the rapidly changing demands of the modern health care environment. This curricular revision keeps the Doctor of Pharmacy program at Ohio State competitive with the very best schools in the country. One of seven schools to offer a PharmD program in Ohio, and the only Ohio school in the Top 10 of the *U.S. News and World Report* rankings, Ohio State will remain poised at the forefront of Ohio pharmacy programs through offering an innovative professional education that retains its historically strong foundation in the pharmaceutical sciences.

Impact of the New Doctor of Pharmacy Program

We firmly believe that the revised PharmD program proposed here will create a stronger, more consistently integrated Doctor of Pharmacy Program at The Ohio State University. The new design helps to facilitate connections for students between content areas, and contains an explicit focus on problem solving. By focusing on application-based learning and real-world simulation, presenting frequent opportunities for spiral learning, and including early preparation for practice settings, the revised curricular structure establishes a more comprehensive preparation for pharmacy students. Our goal is to create a program that attracts top students to Ohio State and attracts employers to hire our graduates. However, we recognize that such a boldly revised program will impact our faculty and current (matriculated) students. We are monitoring these

impacts and have developed strategies to remediate these issues, as specified below. All students admitted for the 2016-2017 academic year will be admitted under the new curriculum. The current students will complete the previously-established curriculum.

Impact on Faculty/Staff

We foresee the implementation of the new curriculum impacting our faculty in two significant ways. First, offering the current curriculum alongside the new curriculum will pose temporary challenges to workload and instructional staffing. Second, content alignment designed into the new curriculum will necessitate that some faculty will begin to teach earlier in the curriculum than previously.

Additionally, as part of the curricular revision, the amount of active learning pedagogy practiced in the classroom will increase significantly. Faculty who have perhaps not used many of these techniques previously will be strongly encouraged to incorporate student-centered pedagogy into their courses and modules. In response to these demands, the position of Program Director of the Office of Teaching, Learning, and Assessment was created within the college with an effective hire date of June 1, 2015. The responsibilities for this position include, in addition to the facilitation and project management of the curricular change process, providing faculty development opportunities within the college specifically associated with learner-centered pedagogy. Additionally, we expect a much greater use of educational technologies like Top Hat and Soft Chalk to be a part of the educational mission of the college going forward. We also have plans to hire an instructional designer and an instructional technologist to help faculty fully integrate appropriate technologies and pedagogical methods into the design and execution of their courses. With the addition of laboratory courses in the first and third years of the program, several new faculty positions will be created to teach these new courses.

Current challenges with respect to available classroom and laboratory space will be exacerbated by the proposed revisions, particularly the expansion of laboratory courses into the first year of the program.

Impact on Current Students

Although the revised PharmD curriculum will be phased in, with successive cohorts of students admitted beginning in Autumn 2016, the process of curricular revision has already begun to inspire positive changes for students completing the current curriculum. Deliberation and reflection about content to be included in the new curriculum has encouraged faculty teaching the current curriculum to implement strategies to address shortcomings in the current coursework. One such example is the revision of Pharmacy 7007, the existing Capstone course. Consideration of assessment strategies during the curricular revision process inspired updates to the Capstone course. Currently, students are required to complete 15 out of 20 performance-based assessments within the Capstone to earn a grade of “satisfactory” for the course and qualify to move on to Advanced Pharmacy Practice Experience rotations. The current practice has unfortunately encouraged students to strive for minimum standards by choosing assessments they could afford to “sacrifice” while still completing the course successfully. To address concerns of students ignoring crucial portions of this program-level assessment, course instructors have proposed changing the final grade in the Capstone course from satisfactory/unsatisfactory to a letter grade based on the percentage of the required 20 assessments that each student passes.

Further, discussions of pharmaceutical calculations content for the revised curriculum have inspired the inclusion of additional calculations-based assessments in Capstone, designed to address perceived weaknesses in student preparation within the current curriculum. The inclusion of these additional

assessments will reinforce material taught in Pharmacy 6240 in the current curriculum and will better prepare current students for these questions on the North American Pharmacist Licensure Examination (NAPLEX).

These and other similar revisions are part of a conscious effort to avoid creating a firm line between "old" and "new" classes and to use the curricular revision process to improve the program for all students. The curricular revision has included input from current students in making many of the changes for the new curriculum. Several fourth-year students participated in the Curriculum Design Institute in Summer 2015 facilitated by the University Center for the Advancement of Teaching (UCAT), sharing their own experience to help develop new modules using the backward design process. Other students participated in focus groups conducted during January and July 2014 that informed the development of the new curriculum by exploring strengths and weaknesses of the current curriculum.

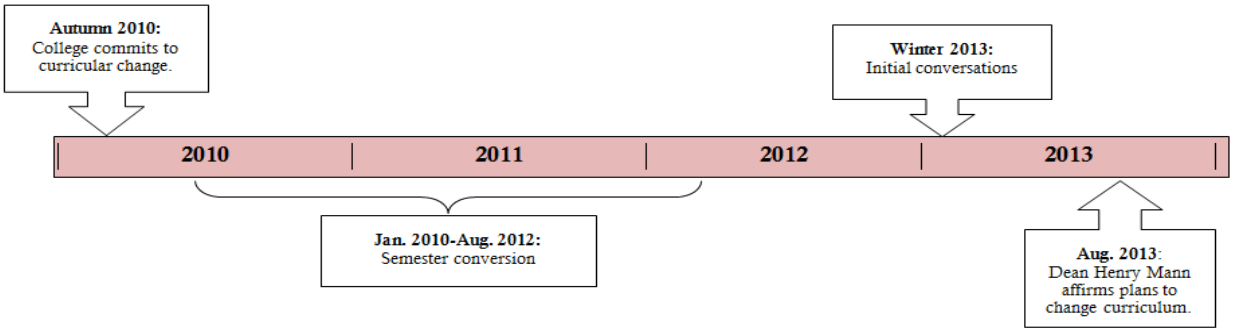
Steps in proposal development, review, and/or approval

The process of curricular revision for the Doctor of Pharmacy has been a multi-year effort involving students, faculty and staff within the College of Pharmacy as well as campus partners, preceptors, members of the Dean's Corporate Council, and other stakeholders inside and outside the college.[7] We have worked extensively to develop this comprehensive PharmD revision with strong support from Dean Henry Mann. With this support, more than 75 faculty, staff and students have worked since 2010 to envision this new approach to our PharmD program. Throughout the process we have endeavored to extensively include the faculty and current students, as evidenced by their participation on multiple task forces and committees.

Our students have been especially valued participants in this process. Starting with ideas for the new curriculum collected from our graduating students in 2013 and 2014, students in each professional year of the current curriculum have served in key roles on our Curricular Change Task Force and PharmD Program Committees. They have also participated in special projects, including Key Issues Teams, Module Teams and the Curriculum Design Institute. Their perspectives and insight have been truly invaluable in the process of envisioning a new curricular model.

Inspired by a self-study and site visit by ACPE in 2010, our journey has evolved through the university's switch to semesters in 2012 and has continued since then through ideation and innovation phases, resulting in plans for implementation in Autumn 2016. An outline of the process to date is described below:

Phase I: Ideation



[7] Meeting minutes from committees, task forces, and other groups participating in the PharmD curricular change process are available upon request from the College of Pharmacy.

- *Autumn 2010: Evaluation team visits the College of Pharmacy* for accreditation review of the Doctor of Pharmacy program. Team members included
    - **Mitra Assemi, PharmD,** Assistant Dean, Accreditation and Quality Improvement, University of California-San Francisco School of Pharmacy, Fresno, California
    - **David Forbes, PhD,** Dean, University of Montana College of Health Professions and Biomedical Sciences, Skaggs School of Pharmacy, Missoula, Montana
    - **Stephanie Phelps, PharmD, BCPS,** Associate Dean, Academic Affairs/Professor, Clinical Pharmacy, University of Tennessee Health Sciences Center, College of Pharmacy, Memphis, Tennessee
    - R**obert M. Elenbaas, PharmD, FCCP**, ACPE Staff, Loch Lloyd, Missouri

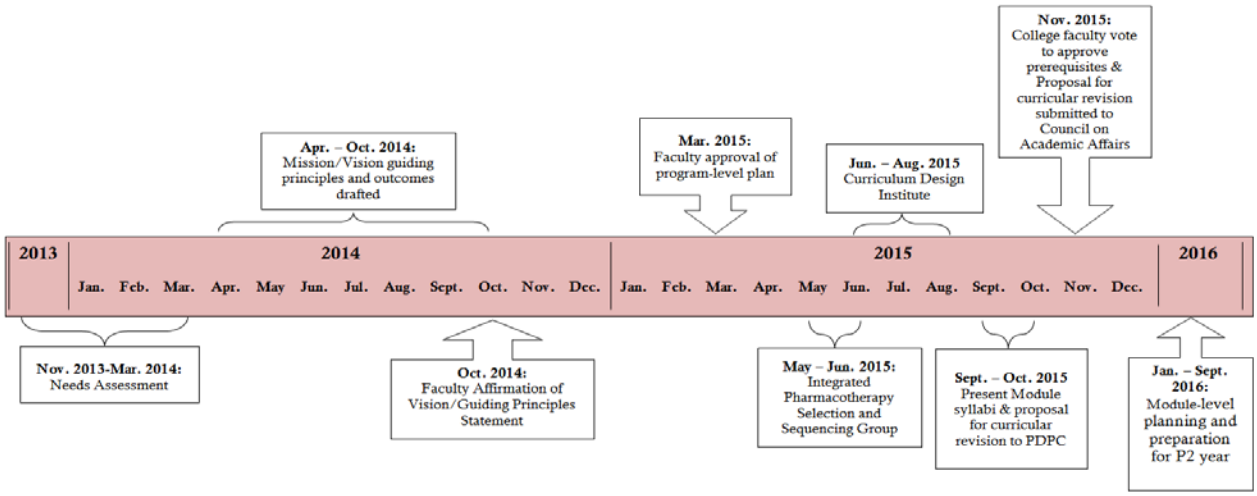
- *January 2010-August 2012: Semester conversion* of existing Doctor of Pharmacy courses. Led by Dr. Katherine Kelley, Assistant Dean for Curriculum and Assessment, this process necessitated the review and revision of PharmD courses for compatibility with the semester format implemented at Ohio State in Summer 2012. The Doctor of Pharmacy Program Committee oversaw course revision for the PharmD program.

- *Winter 2013: An exploratory committee formed* within the College of Pharmacy to discuss potential ideas for revising the PharmD curriculum, based on the process initiated with semester conversion. This group undertook initial steps to explore curriculums at peer institutions and began the process of exploring strengths and weaknesses in the current curriculum.

- *September 11, 2013: PharmD Curricular Change Task Force created.* Led by Dr. Katherine Kelley, then Associate Dean for Curriculum and Assessment, a group of eight faculty members met to discuss a process for exploring curricular change for the PharmD program and re-envisioning a new curriculum that would distinguish Ohio State graduates and provide them with the training, skills and characteristics that would help them to stand out professionally in an increasingly tight job market. Faculty participating in this initial task force included:
    - **Dr. Cari Brackett**, Associate Professor of Clinical Pharmacy, Pharmacy Practice and Administration
    - **Dr. James Coyle**, Associate Professor of Clinical Pharmacy, Pharmacy Practice and Administration
    - **Dr. Kari Hoyt**, Associate Professor, Pharmacology
    - **Dr. Katherine Kelley**, Associate Dean for Curriculum and Assessment
    - **Dr. Julie Legg**, Clinical Assistant Professor, Assistant Director of APPE Education
    - **Dr. Bella Mehta**, Associate Professor of Clinical Pharmacy, Pharmacy Practice and Administration
    - **Dr. Werner Tjarks**, Associate Professor, Medicinal Chemistry and Pharmacognosy
    - **Dr. Jen Whetstone**, Senior Lecturer, Medicinal Chemistry and Pharmacognosy

- *November 27, 2013: Curricular Change Task Force expanded* to incorporate more faculty voices as well as student voices. Members of the PharmD Program Committee were joined by other faculty with specific areas of expertise integral to the curricular revision process. A list of the members of the expanded Task Force is available upon request.

Phase II: Innovation



- *November 27, 2013-March 3, 2015: The PharmD Curricular Change Steering Team was created,* composed of five faculty members representing the PharmD Program Committee leadership plus representation from each division within the College of Pharmacy. Steering Team members were charged with conducting a needs assessment and drafting the Vision, Guiding Principles, Core Goals, and Ability-Based Outcomes for the revised curriculum. These documents were shared with members of the larger Task Force and with college faculty as they were developed, with feedback collected through brown bag meetings, committee meetings, and one-on-one conversations and focus groups with stakeholders. Members of the Steering Team included:
    - **Dr. Kristin Casper**, Chair of the PharmD Program Committee, representative from Pharmacy Practice and Administration Division
    - **Dr. Jeff Johnston**, Vice Chair of the PharmD Program Committee, representative from Pharmaceutics Division
    - **Dr. Kari Hoyt**, PharmD Program Committee representative from Pharmacology Division
    - **Dr. Maria Pruchnicki**, Vice Chair of the PharmD Program Committee, representative from Pharmacy Practice and Administration Division
    - **Dr. Werner Tjarks**, PharmD Program Committee representative from Medicinal Chemistry and Pharmacognosy Division
    - **Dr. James Coyle**, Director of Curricular Change Planning and Implementation
    - **Dr. Katherine Kelley**, Associate Dean for Assessment and Strategic Initiatives

- *May 2, 2014: Timeline for PharmD Curricular Change Process presented* to college faculty. Dr. James Coyle reviewed the structure and process for curricular change, along with a timeline for program-level and course-level planning.

- *May 19-21, 2014: Steering Team attends AACP Institute*, begins of drafting guiding principles, vision and ability-based outcomes for curriculum revision.

- *June 6, 2014: Results of Needs Assessment presented to faculty.* Dr. James Coyle shared the results of the PharmD curricular change needs assessment, which incorporated national pharmacy education standards, objective data, licensure examination results, residency placement results, feedback from stakeholders, satisfaction survey data, publications and expert advice to identify six problems to be addressed through curricular change.

- *September 12, 2014: Vision/Guiding Principles Statement and Ability-Based Outcomes (ABOs) presented to faculty*. Dr. James Coyle presented the vision, guiding principles and ability-based outcomes proposed by the Curricular Change Task Force to college faculty, and updated faculty on next steps in the curricular change planning process.

- *October 3, 2014: Affirmation of Vision/Guiding Principles Statement and ABOs by faculty.* Dr. James Coyle and Dr. James McAuley presented the vision, guiding principles and ability-based outcomes documents with revisions from the September 12 faculty meeting. The faculty affirmed the proposed vision statement.

- *February 6, 2015: Program-level plan for the new curriculum presented to college faculty.* Dr. Katherine Kelley presented a program-level plan for the new PharmD curriculum to college faculty, highlighting the differences between the existing and proposed curriculums. Brown bag meetings were held on February 12 and 16 to invite feedback from students, faculty and staff regarding the program-level plan.

- *March 6, 2015: Approval of program-level plan for new curriculum by faculty*. Dr. Katherine Kelley presented the program-level plan with revisions recommended by the PharmD Program Committee and in brown bag meetings during February 2015. Faculty gave the program-level plan a unanimous vote of approval.

- *April 2015: Leadership for development of modules within new curriculum identified*

- *May-June 2015: Integrated Pharmacotherapy Selection and Sequencing Group recommends sequence* of integrated pharmacotherapy modules to be taught in P2 and P3 years of the new curriculum.

- *June 3, 2015: Members of Module Teams assigned*

- *June 3-August 6, 2015: Curriculum Design Institute* held in five installments during summer semester, facilitated by UCAT. Programming conducted during institute dates provided support for implementing backward design principles in the development of objectives, learning goals, assessments and assignments for modules within the new curriculum. Faculty participating included module team leads, module team members, other faculty and student representatives.

- *September-October 2015: Module syllabi and proposal for curricular revision presented to PharmD Program Committee* for approval.

- *October 2, 2015: Revised prerequisite plan presented to college faculty*. Dr. Kristin Casper presented a proposal for the revision of admissions prerequisites for the PharmD program. Brown bag meetings were held on October 21 to invite feedback from students, faculty and staff regarding the proposed revision.

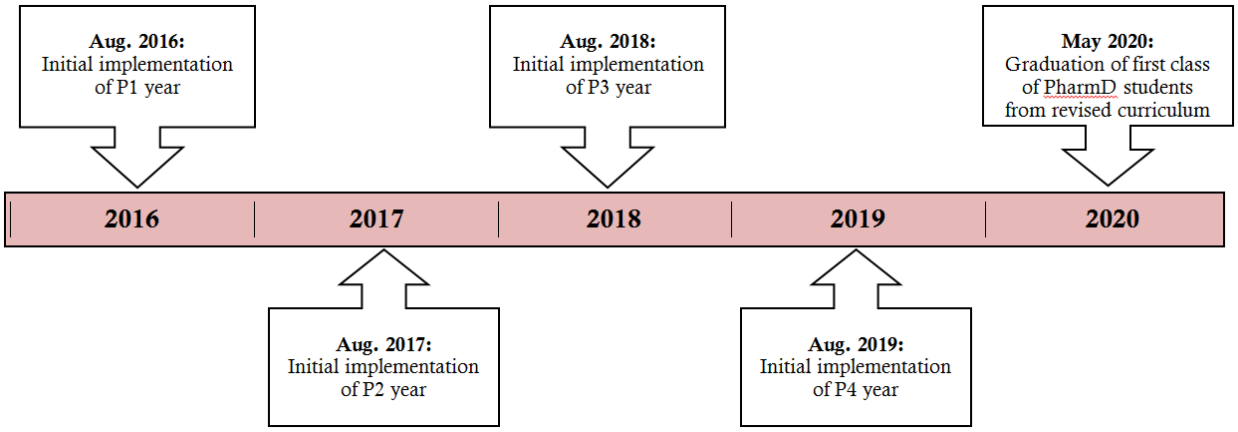
- *November 13, 2015:* College faculty voted to approve prerequisite revisions including the retention of all current prerequisites except for Physics 1201, along with the addition of physiology and biochemistry prerequisites.

- *November 20, 2015:* Proposal for curricular revision submitted to Council on Academic Affairs.

- *January 1, 2016:* Begin module-level planning and preparation for P2 year.

- *September 1, 2016:* Module syllabi due to PharmD Program Committee for review.
- *December 1, 2016:* Module syllabi for P2 year due to College Registrar.
- *January 1, 2017:* Begin module-level planning and preparation for P3 year.
- *September 1, 2017:* Module syllabi due to PharmD Program Committee for review.
- *December 1, 2017:* Module syllabi for P3 year due to College Registrar.
- *January 1, 2018:* Begin module-level planning and preparation for P4 year.
- *September 1, 2018:* Module syllabi due to PharmD Program Committee for review.
- *December 1, 2018:* Module syllabi for P4 year due to College Registrar.

Phase III: Implementation



- *August 1, 2016:* Initial implementation of P1 year.
- *August 1, 2017:* Initial implementation of P2 year.
- *August 1, 2018:* Initial implementation of P3 year.
- *August 1, 2019:* Initial implementation of P4 year.
- *May 2020:* Graduation of first class of PharmD students from revised curriculum.

Conclusion

The faculty of the Ohio State University College of Pharmacy are pleased to submit this proposal for your consideration. We believe that the changes to our Doctor of Pharmacy program outlined in this document will help us create a program that is attractive to the best students, and that will prepare those students to be exemplary pharmacy practitioners highly sought after by employers and post-graduate training programs when they finish.

We have based this proposal on a careful needs assessment, pharmacy licensure and program accreditation requirements, and have developed this plan as a faculty who are dedicated to educating students who are the future of pharmacy practice. This proposal is a cornerstone of the College of Pharmacy's strategic plan, and it will help us to fulfill our mission to advance the pharmacy profession and patient-centered care across Ohio and around the globe. Further, it embodies the university's mission, vision, values and core goals by using an innovative structure that will allow us to deliver an unsurpassed, student-centered learning experience, led by engaged world-class faculty and enhanced by a globally diverse student body.

We thank you for your consideration of this proposal, and welcome your feedback.

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APPENDIX I

Ideation: Data and Supporting Documentation

ENTRY LEVEL PHARMD CURRICULUM

PROFESSIONAL REQUIREMENTS

The entry-level PharmD curriculum includes required sequences of coursework in physiology, pharmaceutics and drug delivery systems, medicinal chemistry, biopharmacy, pharmacy practice, pharmacology and therapeutics, clinical pharmacokinetics, and pharmacy management. Additional courses relating to dietary supplements, herbal products, pharmacogenomics, nonprescription medications and jurisprudence are also required. Course pedagogical techniques include lectures, laboratories, recitations, case conferences, workshops, and Professional Experience Program rotations precepted by clinical faculty within ambulatory and inpatient practice sites. A thread of experiential activities, beginning in the first year, reinforces the didactic component of the curriculum, culminating in full-time advanced practice experiences in the final year. A minimum of 6 hours of professional electives are also required. The required coursework for the entry-level PharmD program and scheduling sequences are outlined below.

REQUIRED FIRST YEAR COURSES

- Pharmacy 6001 Introductory Pharmacy Practice Experience I
- Pharmacy 6002 Introductory Pharmacy Practice Experience II
  - Introductory pharmacy practice experiences. Students apply didactic pharmacy course work in a variety of pharmacy practice settings.
- Pharmacy 6010 Biopharmacy I & Pharmacy 6020 Biopharmacy II
  - A two-course sequence which provides the fundamental background in modern molecular life science required for pharmacy studies.
- Pharmacy 6050 Medicinal Chemistry I
  - The first in a two course sequence covering chemical and biochemical principles governing the properties of drugs.
- Pharmacy 6060 Medicinal Chemistry II
  - The second in a two course sequence covering chemical and biochemical principles governing the properties of drugs and an introduction of the application of immunology principles to pharmacology, therapeutics and patient care.
- Pharmacy 6080 Physiology I
- Pharmacy 6090 Physiology II
  - A two-course sequence presenting the application of physiology to the practice of pharmacy.
- Pharmacy 6210 Drug Delivery I
  - First of a two-course sequence. Principles that govern the design and use of solution dosage forms, including physiochemical properties, ionization, solubility and stability.
- Pharmacy 6220 Drug Delivery II
  - Second of a two-course sequence. Routes of drug administration and the physiologic and physiochemical factors that influence drug penetration, absorption and bioavailability.
- Pharmacy 6240 Pharmaceutical Calculations
  - Introduction to prescription terminology and pharmaceutical calculations; emphasis on measurement systems, conversions, percent preparations, units of concentrations, calculation of doses, dilutions, milliequivalents, and milliosmoles.

- Pharmacy 6260 Laboratory and Diagnostic Testing
  - Introduction of concepts in quantitative analysis and fundamental concepts of analytical measurement with a focus on laboratory technologies and assays relevant to the practicing pharmacist.
- Pharmacy 6610 Pharmacy Practice I
  - The first in a two-course sequence covering concepts fundamental to pharmacy practice. Topics include orientation to the profession, drug information communications, and professionalism.
- Pharmacy 6620 Pharmacy Practice II
  - The second in a two-course sequence covering concepts fundamental to pharmacy practice. Topics include drug information, communications, professionalism, cultural competency, and the health care system.

REQUIRED SECOND YEAR COURSES

- Pharmacy 7003 Introductory Pharmacy Practice Experience III
- Pharmacy 7004 Introductory Pharmacy Practice Experience IV
  - Introductory pharmacy practice experiences. Students apply didactic pharmacy course work in a variety of pharmacy practice settings.
- Pharmacy 7110 Dietary Supplements and Herbal Products
  - An overview of the relevant scientific aspects of dietary supplements and herbal products.
- Pharmacy 7310 Clinical Pharmacokinetics I
- Pharmacy 7320 Clinical Pharmacokinetics II
  - A two-course sequence in clinical pharmacokinetics and pharmacodynamics and their application to pharmacotherapy.
- Pharmacy 7470 Pharmacology and Therapeutics I
- Pharmacy 7480 Pharmacology and Therapeutics II
  - The first two offerings in a four-course sequence in pharmacology, pathophysiology and pharmacotherapy providing a comprehensive study of the therapeutic effects, pharmacodynamics, mechanistic actions, and toxicological effects of important drug classes.
- Pharmacy 7740 Professional Practice Laboratory I & Pharmacy 7750 Professional Practice Laboratory II
  - A two-course professional practice laboratory sequence. Topics include preparation/dispensing of various dosage forms, communication, use of drug information resources, and use of instruments.

REQUIRED THIRD YEAR COURSES

- Pharmacy 7005 Introductory Pharmacy Practice Experience V
- Pharmacy 7006 Introductory Pharmacy Practice Experience VI
  - Introductory pharmacy practice experiences. Students apply didactic pharmacy course work in a variety of pharmacy practice settings.
- Pharmacy 7007 Introductory Pharmacy Practice Experience VII
  - Introductory pharmacy practice experiences. Students apply didactic pharmacy course work in a variety of pharmacy practice settings.
- Pharmacy 7240 Clinical Pharmacogenomics
  - Principles and techniques necessary to understand the role of genetic variation in the pharmacokinetics of drugs and therapeutic management of disease
- Pharmacy 7490 Pharmacology and Therapeutics III
- Pharmacy 7500 Pharmacology and Therapeutics IV

- The last two offerings in a four-course sequence in pharmacology, pathophysiology and pharmacotherapy providing a comprehensive study of the therapeutic effects, pharmacodynamics, mechanistic actions, and toxicological effects of important drug classes.

- Pharmacy 7630 Nonprescription Therapeutics
  - An overview of nonprescription therapeutics with a focus on patient assessment, product recommendations and patient care plans.
- Pharmacy 7860 Pharmacy Practice Management
  - The medication use system, resource management, and the economic evaluation of pharmaceutical services and pharmacoepidemiology.
- Pharmacy 7900 Pharmaceutical Jurisprudence
  - A study of the laws and regulations relating to the practice of pharmacy.

REQUIRED FOURTH YEAR COURSES

- Pharmacy 7008 Professional Activities
  - Independent study activities related to advanced pharmacy practice experiences.
- Pharmacy 7011-7019 Advance Pharmacy Practice Experiences I
- Pharmacy 7011-7019 Advance Pharmacy Practice Experiences II
- Pharmacy 7011-7019 Advance Pharmacy Practice Experiences III
- Pharmacy 7011-7019 Advance Pharmacy Practice Experiences IV
- Pharmacy 7011-7019 Advance Pharmacy Practice Experiences V
- Pharmacy 7011-7019 Advance Pharmacy Practice Experiences VI
- Pharmacy 7011-7019 Advance Pharmacy Practice Experiences VII
- Pharmacy 7011-7019 Advance Pharmacy Practice Experiences VII
- Pharmacy 7011-7019 Advance Pharmacy Practice Experiences IX
  - Advanced pharmacy practice experience rotations including ambulatory, community, institutional and elective settings. Students may receive Honors Level Performance distinction and have a textual note added to their official University transcript.

ELECTIVE REQUIREMENTS

A minimum of 6 hours of program electives must be completed prior to graduation. Elective coursework is to be taken while enrolled in the Doctor of Pharmacy program. Courses taken prior to matriculation into the Doctor of Pharmacy program cannot be counted. Please see the "Professional Electives" document detailing a list of approved courses.

SUMMARY OF ENTRY LEVEL DOCTOR OF PHARMACY CURRICULUM

A summary of the required courses outlined above is included on the next page.

Reaccreditation Report Summary

The Ohio State University College of Pharmacy
Doctor of Pharmacy Program

Evaluation Team Report Completed Fall 2010[8]

A comprehensive on-site review of the Ohio State University's Doctor of Pharmacy program was completed in October 2010 by a team of four evaluators:

- **Mitra Assemi, PharmD**, Assistant Dean, Accreditation and Quality Improvement, University of California San Francisco School of Pharmacy, Fresno, California;
- **David Forbes, PhD**, Dean, University of Montana College of Health Professions and Biomedical Sciences, Skaggs School of Pharmacy, Missoula, Montana;
- **Stephanie Phelps, PharmD, BCPS,** Associate Dean, Academic Affairs/Professor, Clinical Pharmacy, University of Tennessee Health Sciences Center, College of Pharmacy, Memphis, Tennessee; and
- **Robert M. Elenbaas, PharmD, FCCP**, ACPE Staff, Loch Lloyd, Missouri

This comprehensive review paid particular attention to progress and changes made since the preceding comprehensive review completed in 2004, as well as to plans for continuing development. Prior to this visit, the evaluation team reviewed responses from the Accreditation Council for Pharmacy Education (ACPE) to the College of Pharmacy's interim reports filed in 2006, 2007, and 2009. One standard was identified at that time as requiring monitoring, Standard No. 27: Physical Facilities. The 2010 accreditation review was based upon the Accreditation Standards and Guidelines for the Professional Program in Pharmacy Leading to the Doctor of Pharmacy Degree, adopted January 15, 2006 and implemented July 1, 2007 ("Standards 2007"). Thirty individual standards were evaluated, organized into six categories:

- Mission, Planning and Evaluation
- Organization and Administration
- Curriculum
- Students
- Faculty and Staff
- Facilities and Resources

Across these standards, the Ohio State University Doctor of Pharmacy Program was rated compliant on 25 standards, and compliant with monitoring on five standards:

- Evaluation of Achievement of Mission and Goals (Evaluation of Achievement of Mission and Goals)
- College or School Organization and Governance (Organization and Administration)
- Curricular Development, Delivery, and Improvement (Curriculum)
- Curricular Core – Pharmacy Practice Experiences (Curriculum)
- Faculty and Staff Continuing Professional Development and Performance Review (Faculty and Staff)

Standard No. 3: Evaluation of Achievement of Mission and Goals

The college or school must establish and implement an evaluation plan that assesses achievement of the mission and goals. The evaluation must measure the extent to which the desired outcomes of the professional degree program (including assessments of student learning and evaluation of the effectiveness of the curriculum) are being achieved. Likewise, the extent to which the desired outcomes of research and other

[8] Accreditation Council for Pharmacy Education. *Evaluation Team Report of the Professional Program Leading to the Doctor of Pharmacy Degree.* The Ohio State University College of Pharmacy. October 12-14, 2010.

scholarly activities, service, and pharmacy practice programs are being achieved must be measured. The program must use the analysis of process and outcome measures for continuous development and improvement of the professional degree program.

Two sections of this standard were identified as needing improvement:

- The evaluation plan describes a continuous and systematic process of evaluation covering all aspects of the college or school and the accreditation standards. The plan is evidence-based and embraces the principles and methodologies of continuous quality improvement.
- The program assesses achievement of the mission and goals.

Evaluators noted that some important college goals were not included within the current Mission Evaluation Plan document, including "achieving a culturally diverse student body, contributing to professional and scientific organizations, and contributing to The Ohio State University." Evaluators recommended that the college clarify how it assesses achievement of its mission as compared to success in meeting priorities within its strategic plan. They further recommended that the college identify a "manageable number of high priority areas for programmatic assessment" for initial attention, then expand the scope of assessment with additional experiences and resources. Monitoring recommended for this standard included a request for a "brief description of the college's progress with continued development and implementation of its programmatic assessment plan, including evidence that knowledge gained is being used to drive consideration of programmatic enhancement."

Standard No. 7: College or School Organization and Governance

The college or school must be organized and staffed to facilitate the accomplishment of its mission and goals. The college or school administration must have defined lines of authority and responsibility, foster organizational unit development and collegiality, and allocate resources appropriately. The college or school must have published, updated governance documents, such as bylaws and policies and procedures, which have been generated by faculty consensus under the leadership of the dean in accordance with university regulations.

No individual sections of this standard were identified as needing improvement, but evaluators recommended monitoring with regard to the closure of the college's Nontraditional PharmD program, which had been discontinued just prior to the evaluators' visit. Evaluators requested "a brief description of the teach-out and closure of the Nontraditional PharmD Program, including information on the success of those students currently in the program in completing their degree requirements."

Standard No. 10: Curricular Development, Delivery and Improvement

The college or school's faculty must be responsible for the development, organization, delivery, and improvement of the curriculum. The curriculum must define the expected outcomes and be developed, with attention to sequencing and integration of content and the selection of teaching and learning methods and assessments. All curricular pathways must have both required and elective courses and experiences and must effectively facilitate student development and achievement of the professional competencies.

The curriculum for the professional portion of the degree program must be a minimum of four academic years or the equivalent number of hours or credits. The curriculum must include didactic course work to provide the desired scientific foundation, introductory pharmacy practice experiences (not less than 5% of the curricular length) and advanced pharmacy practice experiences (not less than 25% of the curricular length).

One section of this standard was identified as needing improvement:

- The Curriculum Committee (or equivalent) has adequate resources to serve as the central body for the management of orderly and systematic reviews of curricular structure, content, process, and outcomes, based on assessment data.

Evaluators expressed "concern about the workload likely to be imposed" on the college's PharmD Program Committee (curriculum committee) resulting from the upcoming change from the quarter to the semester calendar at Ohio State. Evaluators encouraged the college to "seriously consider what additional resources this group may require over the next few years during this period of transition." Recommended monitoring on this standard requested "a detailed description of implementation of the semester-based, 'integrated' curriculum, any problems encountered and how they were resolved, and a comparison of academic performance and student progression under this new curriculum compared to the current."

Standard No. 14: Curricular Core – Pharmacy Practice Experiences

The college or school must provide a continuum of required and elective pharmacy practice experiences throughout the curriculum, from introductory to advanced, of adequate scope, intensity, and duration to support the achievement of the professional competencies presented in Standard 12.

The pharmacy practice experiences must integrate, apply, reinforce, and advance the knowledge, skills, attitudes, and values developed through the other components of the curriculum. The objectives for each pharmacy practice experience and the responsibilities of the student, preceptor, and site must be defined. Student performance, nature and extent of patient and health care professional interactions, where applicable, and the attainment of desired outcomes must be documented and assessed.

In aggregate, the pharmacy practice experiences must include direct interaction with diverse patient populations in a variety of practice settings and involve collaboration with other health care professionals. Most pharmacy practice experiences must be under the supervision of qualified pharmacist preceptors licensed in the United States.

Three sections of this standard were identified as needing improvement:

- The college or school provides a continuum of required and elective pharmacy practice experiences throughout the curriculum, from introductory to advanced, of adequate scope, intensity, and duration to support the achievement of the professional competencies presented in Standard 12.
- The college or school ensures that preceptors receive orientation regarding the outcomes expected of students and the pedagogical methods that enhance learning, especially for first-time preceptors prior to assuming their responsibilities, ongoing training, and development.
- The introductory pharmacy practice experiences involve actual practice experiences in community and institutional settings and permit students, under appropriate supervision and as permitted by practice regulations, to assume direct patient care responsibilities.

The evaluation team cited shortcomings in the number of hours available for students to participate in institutional-based Introductory Pharmacy Practice Experiences as not being of "adequate scope or duration," representing a "very serious" concern to the evaluation team. Additionally, evaluators expressed concern that all preceptors for practice experiences were not "receiving an adequate orientation regarding the outcomes expected of students and the pedagogical methods that enhance learning." Evaluators recommended that the college assure that new and continuing preceptors complete sufficient preceptor training, and put into place adequate preceptor orientation and development programs that are accessed by preceptors.

Recommended monitoring for this standard included "a detailed description of implementation of the college's plan to provide institutional-based IPPEs of appropriate scope and duration to all students,

including an update on hiring the balance of planned additional personnel within the Office of Experiential Programs." Also, evaluators recommended submission of "a brief description of the college's preceptor orientation and development programs, including mechanisms to assure that preceptors have participated in this training."

Standard No. 26: Faculty and Staff Continuing Professional Development and Performance Review
The college or school must have an effective continuing professional development program for full-time, part-time, and voluntary faculty and staff consistent with their responsibilities. The college or school must review the performance of faculty and staff on a regular basis. Criteria for performance review must be commensurate with the responsibilities of the faculty and staff in the professional degree program.

Two sections of this standard were identified as needing improvement:

- The college or school has an effective continuing professional development program for full-time, part-time, and voluntary faculty and staff consistent with their responsibilities.
- Faculty receive adequate guidance on career development.

In their review of this standard, the evaluation team noted that "the college does not appear to have a formal, structured process to create a personalized, proactive career development plan for individual faculty at all levels." They recommended the college consider "the needs of its voluntary faculty," and "ways to develop those faculty that may be inclined toward an administrative career." Monitoring recommended on this standard included a request for "a brief description of the development and implementation of a systematic professional and career development program for administrators and faculty at all levels."

Accreditation Decision and Follow-Up

Meeting January 19-23, 2011, the ACPE Board of Directors approved continued accreditation for the Ohio State University Doctor of Pharmacy program through 2016-2017. Interim Reports were submitted in 2011 and 2013.

2011
The college filed an Interim Report with ACPE in October 2011. The Board of Directors approved the College as compliant with monitoring on Standards 3, 7, 10, 14, and 26 in an accreditation action letter dated February 17, 2012. The Board noted the following for each standard.

Standard 3: Evaluation of Achievement of Mission and Goals

Comments: The Board notes the changes to the Mission Evaluation plan based on suggestions made in the 2010 Evaluation Team Report, including aligning the outcome measures and metrics with the Mission of the College rather than the Strategic Plan and the inclusion of two areas previously missing from the plan. The Board notes the examples provided of how data from the Mission Evaluation Plan is being used to drive programmatic enhancements

Standard 7: College or School Organization and Governance

Comments: The Board notes that the Non-Traditional Doctor of Pharmacy program is on track to close December 20, 2012, as previously announced, and that the College is working with the remaining students in the program to ensure on-time completion of the program.

Standard 10: Curricular Development, Delivery and Improvement

Comments: The Board notes the plans to implement a semester-based calendar beginning in June 2012, the approval of all PharmD semester courses, the development of a syllabus template, and the plan for review of all professional course syllabi during the 2011-2012 academic year. The Board notes the change to the

analytical chemistry prerequisite in that the course will now be integrated into the PharmD curriculum, as will the physiology course. The Board notes the plans for the next phase of curricular reform and the strategies that will be used to compare academic performance and progression between the quarter and semester curricula.

Standard 14: Curricular Core- Pharmacy Practice Experiences

Comments: The Board notes the changes made to the structure and content of the IPPEs in order to provide an institutional IPPE of appropriate scope and duration to all students and the plans to increase the number of health-system IPPE hours to approximately 80 hours in 2012-13. The Board notes the proposal approved by the Curriculum and Assessment Committee to relocate a capstone experience to become the final IPPE activity. The Board notes the efforts underway to enhance preceptor training and development, including: the appointment of a liaison from the OSU Medical Center to the experiential team to promote training opportunities for Medical Center preceptors; the creation of a monthly electronic newsletter to be distributed to all preceptors; and discussions regarding development of a preceptor training webinar.

Standard 26: Faculty and Staff Continuing Professional Development and Performance Review

Comments: The Board notes the College's plan to implement the process of Continuous Professional Development for faculty and administrators, starting with a series of presentations during the 2011-12 academic year to increase awareness of the process, followed by a February 2012 faculty meeting during which all faculty members will be asked to complete the Faculty Goals Action Plan document.

2013

The college filed an Interim Report with ACPE in October 2013. The Board of Directors upgraded the college to compliant status on Standards 3, 7, 10 and 26. Standard 14: Curricular Core – Pharmacy Practice Experiences remained in compliant with monitoring status. Comments from the Board supplied in an Interim Report Action Document dated January 15-19, 2014, noted the following for each standard:[9]

Standard 3: Evaluation of Achievement of Mission and Goals

Comments: The Board acknowledges receipt of the updated information regarding the College Mission Evaluation Plan. Key changes include enhanced information regarding how the AACP surveys will be utilized, plans for reviewing accreditation standards and compliance two times during the eight-year accreditation cycle, the addition of a metric to evaluate interprofessional education (IPE), and plans for how data collected via the plan will be shared and reported.

Standard 7: College or School Organization and Governance

Comments: The Board notes the closing of the Non-Traditional Doctor of Pharmacy program as of December 31, 2012.

Standard 10: Curricular Development, Delivery and Improvement

Comments: The Board notes that the change to a semester based curriculum has been completed. In addition to curricular changes that were made to accommodate the transition, other curricular changes for purposes of continuous improvement have also been made. Preliminary analysis of outcomes data indicates that these changes have resulted in positive student performance. This will continue to be monitored as the semester conversion fully settles into place.

[9] Accreditation Council for Pharmacy Education. I*nterim Report Action Document: Professional Program Leading to the Doctor of Pharmacy Degree.* The Ohio State University College of Pharmacy. January 15-19, 2014.

Standard 14: Curricular Core- Pharmacy Practice Experiences

Comments: The Board notes that the College is on-track to achieve its goal of a minimum of 80 hours of health-system IPPE for all students during the 2013- 2014 year. The range of actual in-practice IPPE has also been augmented by additional hi-fidelity simulations. Continued support and development should be focused to ensure that this evolution becomes complete. Further examination of IPPE in particular should occur during the next scheduled comprehensive evaluation.

Standard 26: Faculty and Staff Continuing Professional Development and Performance Review

Comments: The Board notes the new series of faculty development activities that has been implemented. This includes goal setting for faculty as an element of annual review processes. This also includes leadership development for the College's administrative leaders.

Next Re-accreditation visit

In July 2014 the College applied for a one-year extension to the accreditation term based on timing and changes in leadership, strategic planning and implementation of a new curriculum.
The extension was granted until 2017-2018.

Pharmacy

Ranked in 2012 | Pharmacy Rankir

Methodology

GRE

As the link between patients and medicine, pharmacists must be experts on prescription drugs and over-the-counter medications, understanding use, side effects and mixtures of medicine. These are the top pharmacy schools. Each school's score reflects its average rating on a scale from 1 (marginal) to 5 (outstanding), based on a survey of academics at peer institutions.

Rank	School name	Score
#1	University of California—San Francisco San Francisco, CA	4.6
#2	University of North Carolina—Chapel Hill Chapel Hill, NC	4.5
#3	University of Minnesota Minneapolis, MN	4.4
#4	University of Texas—Austin Austin, TX	4.3
#5 Tie	University of Kentucky Lexington, KY	4.2
#5 Tie	University of Wisconsin—Madison Madison, WI	4.2
#7 Tie	Ohio State University Columbus, OH	4.1
#7 Tie	Purdue University West Lafayette, IN	4.1
#7 Tie	University of Michigan—Ann Arbor Ann Arbor, MI	4.1
#10 Tie	University of Arizona Tucson, AZ	4.0
#10 Tie	University of Southern California Los Angeles, CA	4.0
#10 Tie	University of Utah Salt Lake City, UT	4.0
#10 Tie	University of Washington Seattle, WA	4.0

http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools/top-health-schools/pharmacy-rankings

Ohio State University Graduating PharmD Students, Perspectives on Current Curriculum, 2011-2015

Comparison of levels of agree/strongly agree ratings given to curriculum-focused items by Ohio State respondents to American Association of Colleges of Pharmacy annual Graduating Student Survey.

		Ohio State University College of Pharmacy % Positive response (Agree + Strongly Agree) [10], [11]				
		2011 (n=87)	**2012 (n=99)**	**2013 (n=93)**	**2014 (n=81)**	**2015 (n=97)**
10	The Pharm.D. Program prepared me to communicate with health care providers.	95.4%	96.9%	97.9%	96.3%	92.8%
11	The Pharm.D. Program prepared me to communicate with patients and caregivers.	96.5%	97.9%	100%	100%	95.9%
12	The Pharm.D. Program prepared me to gather and use specific information (e.g., patient histories, medical records) to identify patient medication-related problems.	97.7%	98.0%	96.8%	98.8%	95.9%
13	The Pharm.D. Program prepared me to develop a patient care plan to manage each medication -related problem.	95.4%	99.0%	96.8%	98.8%	95.9%
14	**The Pharm.D. Program prepared me to work with the health care team to implement the patient care plan.**	**94.2%**	**96.0%**	**92.5%**	**87.7%**	**79.4%**
15	The Pharm.D. Program prepared me to document pharmaceutical care activities.	95.4%	92.9%	96.8%	95.1%	86.6%
16	**The Pharm.D. Program prepared me to interpret epidemiologic data relevant to specific diseases and their management.**	**89.6%**	**90.9%**	**80.6%**	**77.8%**	**78.4%**
17	**The Pharm.D. Program prepared me to interpret economic data relevant to treatment of disease.**	**79.3%**	**78.8%**	**68.8%**	**67.9%**	**54.6%**
18	The Pharm.D. Program prepared me to manage the system of medication use to affect patients.	88.5%	95.9%	91.4%	93.8%	89.7%
19	The Pharm.D. Program prepared me to identify and use risk reduction strategies to minimize medication errors.	95.4%	94.9%	91.4%	97.5%	85.6%
20	The Pharm.D. Program prepared me to provide patient care in accordance with legal, ethical, social, economic, and professional guidelines.	96.5%	97.0%	100%	97.5%	94.8%
21	**The Pharm.D. Program prepared me to work with other stakeholders (e.g., patients and other health professionals) to engender a team approach to assure appropriate use of health care resources in providing patient care.**	**93.1%**	**92.9%**	**92.4%**	**88.9%**	**79.4%**
22	The Pharm.D. Program prepared me to interpret and apply drug use policy and health policy.	86.2%	91.0%	89.3%	80.2%	77.3%
23	The Pharm.D. Program prepared me to work with other stakeholders (e.g., patients and other health professionals) to identify and resolve problems related to medication use.	95.4%	93.9%	94.6%	93.8%	86.6%

[10] Items in bold type show an average agree/strongly agree rating below 70% when results from 2011-2015 are compiled using a weighted average, or include a negative difference greater than 10% when 2011 and 2015 levels of agreement are compared. These represent areas showing consistent low ratings or notable declines in levels of student satisfaction over this five-year period.

[11] Average Graduating Student Survey Response Rate for this time period: 72.7%. Response rates per year were as follows 2011(70.7%); 2012 (77.95%); 2013 (76.20%); 2014 (60.4%); 2015 (79.5%).

		Ohio State University College of Pharmacy % Positive response (Agree + Strongly Agree) [10, 11]				
		2011 (n=87)	**2012 (n=99)**	**2013 (n=93)**	**2014 (n=81)**	**2015 (n=97)**
24	The Pharm.D. Program prepared me to promote wellness and disease prevention services.	95.4%	99.0%	95.7%	100%	93.8%
25	**The Pharm.D. Program prepared me to practice pharmacy in interprofessional and collaborative practice settings.**	**96.6%**	**95.9%**	**92.5%**	**92.6%**	**84.5%**
26	The Pharm.D. Program prepared me to search the health sciences literature.	96.5%	99.0%	97.9%	100%	95.9%
27	The Pharm.D. Program prepared me to evaluate the health sciences literature.	92.0%	97.0%	94.6%	96.3%	93.8%
28	The Pharm.D. Program prepared me to reflect critically on personal skills and actions and make plans to improve when necessary.	95.4%	94.0%	91.4%	97.5%	86.6%
29	The Pharm.D. Program prepared me to accept and respond to constructive feedback.	94.3%	97.0%	91.4%	92.6%	88.7%
30	**The sequence of courses was appropriate to build my knowledge and skills.**	**88.5%**	**93.0%**	**87.1%**	**80.2%**	**75.3%**
31	I developed the skills needed to prepare me for continued learning after graduation.	96.5%	97.9%	93.5%	97.5%	87.6%
32	I was provided opportunities to engage in active learning (e.g., laboratories, recitations, student portfolios, problem-based learning, in-class activities).	95.4%	97.9%	96.7%	98.8%	95.9%
33	I was encouraged to ask questions in class.	83.9%	88.9%	83.8%	88.9%	86.6%
34	Pharmacy-related elective courses met my needs as a Pharm.D. student.	80.5%	92.9%	86.0%	91.4%	79.4%
35	Course loads were reasonable.	92.0%	96.9%	88.2%	85.2%	83.5%
36	The program included opportunities to develop professional attitudes, ethics and behaviors.	94.3%	95.0%	94.6%	96.3%	94.8%
37	**My introductory pharmacy practice experiences were valuable in helping me to prepare for my advanced pharmacy practice experiences.**	**62.0%**	**81.9%**	**65.6%**	**60.5%**	**56.7%**
38	**My introductory pharmacy practice experiences permitted my involvement in direct patient care responsibilities in both community and institutional settings.**	**64.4%**	**85.8%**	**64.5%**	**60.5%**	**70.1%**
40	The process by which I was assigned sites for introductory pharmacy practice experiences was fair.	82.8%	90.9%	75.2%	87.7%	81.4%
41	In the community pharmacy setting, I was able to apply my patient care skills.	95.4%	91.9%	92.5%	97.5%	95.9%
42	In the ambulatory care setting, I was able to apply my patient care skills.	89.6%	97.0%	100%	100%	95.9%
43	In the hospital or health-system pharmacy setting, I was able to apply my patient care skills.	92.0%	94.9%	89.2%	88.9%	88.7%
44	In the inpatient/acute care setting, I was able to apply my patient care skills.	91.9%	91.9%	87.1%	88.9%	88.7%
45	The need for continuity of care throughout the health care system was emphasized in the advanced pharmacy	89.7%	91.9%	91.4%	95.1%	91.8%

		Ohio State University College of Pharmacy % Positive response (Agree + Strongly Agree) [10, 11]				
		2011 (n=87)	**2012 (n=99)**	**2013 (n=93)**	**2014 (n=81)**	**2015 (n=97)**
	practice experiences.					
46	The variety of the available advanced pharmacy practice experience electives met my needs as a student.	87.3%	94.0%	88.2%	96.3%	82.8%
47	I was academically prepared to enter my advanced pharmacy practice experiences.	87.3%	95.0%	93.6%	90.1%	90.7%
48	The sites available for advanced pharmacy practice experiences were of high quality.	89.6%	92.9%	95.7%	98.8%	91.8%
49	The process by which I was assigned sites for advanced pharmacy practice experiences was fair.	83.9%	95.0%	86.0%	93.8%	88.7%
50	Overall, my advanced practice experiences were valuable in helping me to achieve the professional competencies.	95.4%	97.0%	95.7%	98.8%	92.8%
51	My pharmacy practice experiences allowed me to have direct interaction with diverse patient populations (e.g. age, gender, ethnic and/or cultural background, disease states, etc.).	97.7%	98.0%	100%	100%	99.0%
52	My pharmacy practice experiences allowed me to collaborate with other health care professionals.	96.6%	97.9%	98.9%	97.5%	97.9%
84	I am prepared to enter pharmacy practice.	96.5%	97.0%	96.8%	97.5%	92.8%

Graduating Students, Perspectives on Current Curriculum, Comparison with Peer and National Data[12]

		Ohio State University College of Pharmacy			CIC Peer Institutions[13], [14]			National Data (All Schools)		
		2013 (93)	2014 (81)	2015 (97)	2013 (910)	2014 (630)	2015 (983)	2013 (9,405)	2014 (9,527)	2015 (10,093)
		% Positive			% Positive			% Positive		
The Goal of the Curriculum										
36	The program included opportunities to develop professional attitudes, ethics and behaviors.	94.6%	96.3%	94.8%	97.6%	95.1%	95.5%	95.2%	94.9%	95.1%
Curricular Development, Delivery and Improvement										
30	**The sequence of courses was appropriate to build my knowledge and skills.**	87.1%	80.2%	**75.3%**	85.4%	87.8%	**86.0%**	87.6%	88.1%	**88.9%**
34	Pharmacy-related elective courses met my needs as a Pharm.D. student.	86.0%	91.4%	79.4%	87.4%	86.2%	87.3%	86.6%	86.4%	87.3%
35	Course loads were reasonable.	88.2%	85.2%	83.5%	91.0%	87.3%	85.0%	89.1%	87.8%	88.3%
Teaching and Learning Methods										
28	The Pharm.D. Program prepared me to reflect critically on personal skills and actions and make plans to improve when necessary.	91.4%	97.5%	86.6%	98.1%	95.7%	95.7%	95.8%	95.7%	96.2%
29	The Pharm.D. Program prepared me to accept and respond to constructive feedback.	91.4%	92.6%	88.7%	97.5%	94.8%	95.4%	95.5%	95.6%	95.9%
31	I developed the skills needed to prepare me for continued learning after graduation.	93.5%	97.5%	87.6%	97.8%	96.5%	95.3%	95.7%	95.6%	95.8%
32	I was provided opportunities to engage in active learning (e.g., laboratories, recitations, student portfolios, problem-based learning, in-class activities).	96.7%	98.8%	95.9%	97.7%	95.9%	96.4%	96.4%	96.7%	97.2%
33	I was encouraged to ask	83.8%	88.9%	86.6%	91.9%	89.2%	89.3%	91.4%	90.9%	92.2%

[12] Strongly agree + agree ratings for each item have been summed. Items selected have been taken from mapping of ACPE standards to AACP surveys, as provided by the American Association of Colleges of Pharmacy. Items highlighted in bold indicate items with levels of agreement at least 10% lower among 2015 Ohio State students as compared to their 2015 counterparts at CIC institutions or national institutions.

[13] Although the AACP Graduating Student Survey is administered annually, individual schools participate at different points in their accreditation cycle. Because of this, the composition of peer groups can vary from year to year, dependent upon the colleges/schools of pharmacy participating in a given academic year.

[14] **2013 CIC Peer Cohort** included Purdue University, Rutgers, University of Iowa, University of Illinois at Chicago, University of Maryland, University of Michigan, University of Minnesota, University of Nebraska-Lincoln, and University of Wisconsin-Madison. **2014 CIC Peer Cohort** included Rutgers, University of Iowa, University of Maryland, University of Michigan, University of Minnesota, University of Nebraska-Lincoln, and University of Wisconsin-Madison. **2015 CIC Peer Cohort** included Purdue University, Rutgers, University of Iowa, University of Illinois at Chicago, University of Maryland, University of Michigan, University of Minnesota, University of Nebraska-Lincoln and University of Wisconsin-Madison.

		Ohio State University College of Pharmacy			CIC Peer Institutions[13, 14]			National Data (All Schools)		
		2013 (93)	2014 (81)	2015 (97)	2013 (910)	2014 (630)	2015 (983)	2013 (9,405)	2014 (9,527)	2015 (10,093)
		% Positive			% Positive			% Positive		
	questions in class.									
Professional Competencies and Outcome Expectations										
10	The Pharm.D. Program prepared me to communicate with health care providers.	97.9%	96.3%	92.8%	97.4%	95.4%	95.1%	96.4%	96.0%	96.6%
11	The Pharm.D. Program prepared me to communicate with patients and caregivers.	100%	100%	95.9%	98.9%	98.3%	98.2%	97.7%	97.8%	98.0%
12	The Pharm.D. Program prepared me to gather and use specific information (e.g., patient histories, medical records) to identify patient medication-related problems.	96.8%	98.8%	95.9%	98.8%	97.8%	97.4%	98.1%	98.0%	98.6%
13	The Pharm.D. Program prepared me to develop a patient care plan to manage each medication -related problem.	96.8%	98.8%	95.9%	99.0%	97.0%	97.6%	97.7%	97.5%	98.1%
14	**The Pharm.D. Program prepared me to work with the health care team to implement the patient care plan.**	92.5%	87.7%	**79.4%**	94.9%	92.4%	**93.3%**	94.4%	93.7%	**94.6%**
15	The Pharm.D. Program prepared me to document pharmaceutical care activities.	96.8%	95.1%	86.6%	95.8%	93.5%	94.1%	95.2%	94.6%	95.2%
16	**The Pharm.D. Program prepared me to interpret epidemiologic data relevant to specific diseases and their management.**	80.6%	77.8%	**78.4%**	88.6%	84.1%	**86.1%**	89.2%	88.0%	**89.2%**
17	**The Pharm.D. Program prepared me to interpret economic data relevant to treatment of disease.**	68.8%	67.9%	**54.6%**	78.9%	70.2%	**75.1%**	80.2%	78.9%	**80.0%**
18	The Pharm.D. Program prepared me to manage the system of medication use to affect patients.	91.4%	93.8%	89.7%	92.3%	90.2%	92.7%	93.3%	92.8%	93.8%
19	The Pharm.D. Program prepared me to identify and use risk reduction strategies to minimize medication errors.	91.4%	97.5%	85.6%	92.5%	93.5%	92.6%	93.5%	93.7%	94.4%
20	The Pharm.D. Program prepared me to provide patient care in accordance with legal, ethical, social, economic, and professional guidelines.	100%	97.5%	94.8%	97.4%	97.9%	96.5%	96.9%	96.8%	97.0%
21	**The Pharm.D. Program**	92.4%	88.9%	**79.4%**	93.3%	91.6%	**92.0%**	92.4%	91.5%	**92.6%**

		Ohio State University College of Pharmacy			CIC Peer Institutions[13, 14]			National Data (All Schools)		
		2013 (93)	2014 (81)	2015 (97)	2013 (910)	2014 (630)	2015 (983)	2013 (9,405)	2014 (9,527)	2015 (10,093)
		% Positive			% Positive			% Positive		
	prepared me to work with other stakeholders (e.g., patients and other health professionals) to engender a team approach to assure appropriate use of health care resources in providing patient care.									
22	**The Pharm.D. Program prepared me to interpret and apply drug use policy and health policy.**	89.3%	80.2%	**77.3%**	88.5%	85.4%	**87.3%**	90.0%	88.8%	**90.2%**
23	The Pharm.D. Program prepared me to work with other stakeholders (e.g., patients and other health professionals) to identify and resolve problems related to medication use.	94.6%	93.8%	86.6%	94.8%	92.7%	93.4%	94.2%	93.9%	94.5%
24	The Pharm.D. Program prepared me to promote wellness and disease prevention services.	95.7%	100%	93.8%	97.6%	95.7%	96.5%	97.0%	97.1%	97.2%
25	**The Pharm.D. Program prepared me to practice pharmacy in interprofessional and collaborative practice settings.**	92.5%	92.6%	**84.5%**	95.4%	94.0%	**95.2%**	95.4%	95.1%	**96.0%**
26	The Pharm.D. Program prepared me to search the health sciences literature.	97.9%	100%	95.9%	98.5%	97.0%	97.6%	97.1%	96.7%	96.7%
27	The Pharm.D. Program prepared me to evaluate the health sciences literature.	94.6%	96.3%	93.8%	96.5%	95.1%	96.2%	95.6%	95.0%	95.3%
28	The Pharm.D. Program prepared me to reflect critically on personal skills and actions and make plans to improve when necessary.	91.4%	97.5%	86.6%	98.1%	95.7%	95.7%	95.8%	95.7%	96.2%
29	The Pharm.D. Program prepared me to accept and respond to constructive feedback.	91.4%	92.6%	88.7%	97.5%	94.8%	95.4%	95.5%	95.6%	95.9%
84	I am prepared to enter pharmacy practice.	96.8%	97.5%	92.8%	95.8%	95.1%	94.7%	94.7%	94.9%	95.1%
Curricular Core – Knowledge, Skills, Attitudes and Values										
34	Pharmacy-related elective courses met my needs as a Pharm.D. student.	86.0%	91.4%	79.4%	87.4%	86.2%	87.3%	86.6%	86.4%	87.3%
47	I was academically prepared to	93.6%	90.1%	90.7%	93.8%	92.9%	92.2%	92.3%	91.2%	93.0%

		Ohio State University College of Pharmacy			CIC Peer Institutions[13, 14]			National Data (All Schools)		
		2013 (93)	2014 (81)	2015 (97)	2013 (910)	2014 (630)	2015 (983)	2013 (9,405)	2014 (9,527)	2015 (10,093)
		% Positive			% Positive			% Positive		
	enter my advanced pharmacy practice experiences.									
Curricular Core – Pharmacy Practice Experiences										
37	**My introductory pharmacy practice experiences were valuable in helping me to prepare for my advanced pharmacy practice experiences.**	65.6%	60.5%	**56.7%**	80.1%	77.9%	**77.1%**	81.5%	81.7%	**82.8%**
38	**My introductory pharmacy practice experiences permitted my involvement in direct patient care responsibilities in both community and institutional settings.**	64.5%	60.5%	**70.1%**	79.9%	77.3%	**76.8%**	81.1%	81.2%	**83.3%**
40	The process by which I was assigned sites for introductory pharmacy practice experiences was fair.	75.2%	87.7%	81.4%	92.6%	88.6%	87.6%	87.7%	87.8%	89.1%
41	In the community pharmacy setting, I was able to apply my patient care skills.	92.5%	97.5%	95.9%	92.1%	89.4%	89.9%	92.4%	92.1%	92.4%
42	In the ambulatory care setting, I was able to apply my patient care skills.	100%	100%	95.9%	94.5%	93.5%	93.1%	95.7%	94.7%	95.4%
43	In the hospital or health-system pharmacy setting, I was able to apply my patient care skills.	89.2%	88.9%	88.7%	92.6%	92.2%	91.5%	92.2%	92.2%	93.5%
44	In the inpatient/acute care setting, I was able to apply my patient care skills.	87.1%	88.9%	88.7%	96.0%	96.8%	96.4%	94.9%	94.9%	95.9%
45	The need for continuity of care throughout the health care system was emphasized in the advanced pharmacy practice experiences.	91.4%	95.1%	91.8%	95.1%	93.7%	93.1%	94.7%	94.5%	95.6%
46	The variety of the available advanced pharmacy practice experience electives met my needs as a student.	88.2%	96.3%	92.8%	94.2%	92.1%	90.2%	91.1%	91.0%	91.8%
48	The sites available for advanced pharmacy practice experiences were of high quality.	95.7%	98.8%	91.8%	94.4%	94.9%	93.3%	92.1%	92.2%	92.8%
49	The process by which I was	86.0%	93.8%	88.7%	90.7%	89.5%	89.4%	89.8%	89.4%	90.5%

		Ohio State University College of Pharmacy			CIC Peer Institutions[13, 14]			National Data (All Schools)		
		2013 (93)	2014 (81)	2015 (97)	2013 (910)	2014 (630)	2015 (983)	2013 (9,405)	2014 (9,527)	2015 (10,093)
		% Positive			% Positive			% Positive		
	assigned sites for advanced pharmacy practice experiences was fair.									
50	Overall, my advanced practice experiences were valuable in helping me to achieve the professional competencies.	95.7%	98.8%	92.8%	98.6%	97.1%	96.3%	96.2%	96.3%	96.9%
51	My pharmacy practice experiences allowed me to have direct interaction with diverse patient populations (e.g. age, gender, ethnic and/or cultural background, disease states, etc.).	100%	100%	99.0%	98.5%	97.0%	96.9%	97.7%	97.7%	98.2%
52	My pharmacy practice experiences allowed me to collaborate with other health care professionals.	98.9%	97.5%	97.9%	98.6%	97.6%	96.5%	97.5%	97.7%	98.0%
Assessment and Evaluation of Student Learning and Curricular Effectiveness										
28	The Pharm.D. Program prepared me to reflect critically on personal skills and actions and make plans to improve when necessary.	91.4%	97.5%	86.6%	98.1%	95.7%	95.7%	95.8%	95.7%	96.2%

Ohio State University College of Pharmacy Faculty Perspectives on Current Curriculum[15]

		Ohio State University College of Pharmacy		Peer Institutions[16]		National Data (All Schools)	
		2013 (34)	2015 (40)	2013 (327)[17]	2015 (273)[18]	2013 (3,064)	2015 (3,056)
		54.8% response	67.8% response	73.7% response	56.9% response	76.5% response	72.4% response
		% Positive[19]		% Positive		% Positive	
Curricular Development, Delivery and Improvement							
40	The curriculum is consistent with the collective vision of the faculty and administration.	85.3%	82.5%	79.8%	84.2%	85.4%	85.3%
41	Faculty are consulted in curricular matters.	91.2%	100%	89.9%	90.5%	90.1%	92.1%
42	**The organization and structure of the curriculum is clear.**	85.3%	**72.5%**	75.8%	**79.5%**	86.7%	**86.9%**
43	**I understand how my instructional content fits into the curriculum.**	88.2%	**85%**	85.9%	**92.3%**	92.9%	**94.4%**
44	The curriculum is taught at a depth that supports understanding of central concepts and principles.	85.3%	85%	79.5%	89.4%	87.5%	88.1%
45	Curricular collaboration among disciplines is encouraged at my college/school.	73.5%	90%	81.0%	89.4%	84.8%	86.3%
46	The college/school uses programmatic assessment data to improve the curriculum.	88.2%	87.5%	74.3%	82.1%	78.7%	80.5%
Teaching and Learning Methods							
38	**Overall, faculty encourage students to assume responsibility for their own learning.**	76.5%	**82.5%**	77.1%	**89.7%**	84.8%	**87.9%**
39	**Laboratories and other non-classroom environments are conducive to learning.**	73.5%	**75%**	82.9%	**82.8%**	84.7%	**86.3%**
Professional Competencies and Outcome Expectations							
47	**The PharmD Program prepares students to develop and use patient-specific pharmacy care plans.**	79.4%	**82.5%**	80.4%	83.9%	87.2%	**88.4%**
48	**The PharmD Program prepares students to**	70.6%	**75%**	73.7%	**80.2%**	82.2%	**83.5%**

[15]Items included are curriculum-specific questions taken from the Faculty Curriculum Quality Survey administered annually by the American Association of Colleges of Pharmacy. Categories used for grouping are taken from a mapping of Accreditation Council for Pharmacy Education (ACPE) standards to AACP surveys: Plaza CM, Patton JM, Kelley KA, Taylor DA. Principles of Good Use for the AACP Curriculum Quality Perception Surveys. American Association of Colleges of Pharmacy; Alexandria, VA: 2014. Available at: www.aacp.org.

[16] The AACP Faculty Survey is administered annually, but individual schools choose to participate at different points in their accreditation cycles. Ohio State participated twice during this cycle, in 2013 and 2015. Because of this variability, composition of peer groups vary from year to year, depending upon the colleges/schools of pharmacy participating in a given academic year.

[17] 2013 Peer Cohort included Purdue University, the University of Arizona, University of Colorado, University of Illinois at Chicago, and University of Maryland. Response rate: 73.7%.

[18] 2015 Peer Cohort included Rutgers, the University of Iowa, University of Maryland, University of Michigan, the University of Minnesota, and University of Wisconsin-Madison. Response rate: 56.9%

[19] % Positive = summed agree + strongly agree ratings for each item. Items with percentages in bold reflect Ohio State faculty responses with levels of agreement at least 5% lower than levels of agreement recorded by faculty at peer or other ACPE-member colleges/schools of pharmacy

		Ohio State University College of Pharmacy		Peer Institutions[16]		National Data (All Schools)	
		2013 (34)	2015 (40)	2013 (327)[17]	2015 (273)[18]	2013 (3,064)	2015 (3,056)
		54.8% response	67.8% response	73.7% response	56.9% response	76.5% response	72.4% response
		% Positive[19]		% Positive		% Positive	
	develop and use patient-specific pharmacy care plans.						
49	**The PharmD Program prepares students to develop disease management programs.**	73.5%	**72.5%**	69.4%	75.1%	79.7%	**80.9%**
50	**The PharmD Program prepares students to manage the system of medication use.**	76.5%	**77.5%**	74.0%	78.0%	82.7%	**84.2%**
51	The PharmD Program prepares students to promote the availability of health promotion and disease prevention initiatives.	76.5%	85%	78.9%	82.1%	85.9%	87.6%
52	The PharmD Program prepares students to communicate with patients, caregivers, and other members of the interprofessional health care team.	79.4%	90%	80.1%	86.1%	88.1%	89.8%
53	The PharmD Program prepares students to search the health sciences literature.	85.3%	90%	85.0%	86.4%	88.3%	89.6%
54	**The PharmD Program prepares students to evaluate the health sciences literature.**	82.4%	**80%**	79.8%	83.5%	85.5%	**86.7%**
55	**The PharmD Program prepares students to demonstrate expertise in the area of informatics (resources, devices, and methods required to optimize the acquisition, storage, retrieval, and use of information in pharmacy and health care).**	55.9%	**60%**	58.4%	60.1%	71.0%	**71.9%**
56	The PharmD Program prepares students to apply state and federal laws and regulations to the practice of pharmacy.	85.3%	87.5%	81.0%	84.2%	87.4%	90.0%
57	The PharmD Program prepares students to maintain professional competence.	85.3%	87.5%	81.7%	86.8%	88.3%	90.1%
Assessment and Evaluation of Student Learning and Curricular Effectiveness							
46	The college/school uses programmatic assessment data to improve the curriculum.	88.2%	87.5%	74.3%	82.1%	78.7%	80.5%

PharmD Admissions Prerequisite Comparison

Data from 2015-16 AACP Pre-professional Course Reuirements by Pharmacy Degree Institution and College/School Websites

		Ohio State University	University of North Carolina	University of Minnesota	University of Wisconsin-Madison	University of Michigan
	US News Ranking	**7**	**2**	**3**	**5**	**7**
Prerequisite Summary	Total # Quarter Hours	180	130	54	102	80
	Total # Quarters					
	Total # Semester Hours	120	62-65	48	68	100
	Total # Semesters					
	0-6 Program Offered					
	B.S. Required (not preferred)	yes				
Prerequisite Course Summary	General Biology I	R *(with lab)*	R *(with lab)*	R *(with lab)*	R	R
	General Biology II			R *(adv bio, biochem recommended)*	R	R
	Anat & Phys/Human Anatomy	R *(with lab)*	R *(with lab)*	R *(2 courses, with lab)*		R (2 courses - *anatomy must cover entire human body; physiology new prereq Fall 2016*)
	Cell Biology					
	Genetics or Genomic Biology					R
	Immunology					
	Kinesiology					
	Microbiology	R *(with lab)*	R *(with lab)*	R *(with lab)*	R *(lab not required)*	R *(with lab)*
	Molecular Biology					
	Zoology					
	General Chemistry I	R *(with lab)*	R *(with lab)*	R*	R *(with lab)*	R
	General Chemistry II	R *(with lab)*	R *(with lab)*	R*	R *(with lab)*	R
	Organic Chemistry I	R *(with lab)*	R *(with lab)*	R*	R *(with lab)*	R
	Organic Chemistry II	R *(with lab)*	R *(with lab)*	R*	R *(with lab)*	R
	Analytic Chemistry		R *(with lab)*			
	Biochemistry		CR *(Biological Chemistry Required)*	*(see General Biology II)*		R *(no lab required)*
	Pre-Calc	R				
	Calculus	R	R *(calculus of one variable)*	R	R *(for math/sci majors)*	R
	Stats	R	R	R	R	R
	Computer Application/Science					
	Physics I	R *(with lab; regular or calculus-based)*	R *(calculus-based with lab)*	R *(one course if calculus-based)*	R *(with lab)*	R *(calculus-based)*
	Physics II	R *(with lab; regular or calculus-based)*	R *(calculus-based with lab)*	R *(two courses if algebra-based)*	R *(with lab)*	R *(calculus-based)*
	Social Sciences		*R*			R (2 courses)
	Psychology				R	
	Poly Sci					
	History		*R*			
	Human Behavior/Behavioral Science			R (2 courses *or US Bachelor Degree - recommended*)		
	Western Civilization					
	Anthropology				CR	
	Sociology				CR	
	Economics				R (microeconomics)	
	Ethics					
	Gender/Ethnic Studies				R	

PharmD Admissions Prerequisite Comparison

Data from 2015-16 AACP Pre-professional Course Reuirements by Pharmacy Degree Institution and College/School Websites

		Ohio State University	University of North Carolina	University of Minnesota	University of Wisconsin-Madison	University of Michigan
	US News Ranking	**7**	**2**	**3**	**5**	**7**
	Business/Accounting					
	Critical Thinking					
	Physical Education					
	International Culture					
	Humanities					CR *(or foreign language - 2 sem/3 qtr required)*
	Fine Art		*R (Visual/ Peforming)*			
	General Education/Electives				R	
	English/English Composition		R	R *(or US Bachelor Degree - recommended)*	R	R
	Literature		*R*			
	Writing					
	Rhetoric					
	Religious Studies					
	Philosophy		*R (ethics/ moral reasoning)*			
	Music/Music Appreciation					
	Foreign Language		*R*			CR *(or humanities - 2 sem/3 qtr required)*
	Communication			CR		
	Public Speaking/Speech			R *(or US Bachelor Degree - recommended)*		
	Institution Specific		R	R	R	
High School Courses	English					
	Math					
	Science					
	History/Social Science					
	College Prep					
	Foreign Language					
	Humanities					

Regular Text: Information from 2015-16 AACP Preerquisite Summary Chart

http://www.aacp.org/resources/student/pharmacyforyou/admissions/admissionrequirements/Documents/2015-16%20PharmacyPre-RequisiteInformation2.pdf

Italics: Information from college/school website

R: Required for Admission

CR: Conditional Requirement, subject may be substituted to fill prerequisite

S: Suggested/recommended, not required for admission

* one lab required, two labs recommended for general chemistry & organic chemistry sequences

APPENDIX II

Innovation: Data and Supporting Documents

Vision and Guiding Principles for Doctor of Pharmacy Education
College of Pharmacy
The Ohio State University

Vision

Graduates of The Ohio State University Doctor of Pharmacy program will be exemplary patient care providers who serve as the responsible medication experts in the healthcare delivery system. They will be exceptionally well prepared for entry-level pharmacy practice and advanced pharmacy education.

Guiding Principles for Pharm.D. Education

To achieve this Vision, the OSU Doctor of Pharmacy program will

- actively engage students in obtaining a world-class professional education in collaboration with the College of Pharmacy's faculty and educational partners,
- help students develop the attitudes and behaviors, knowledge, component skills, and abilities required to become exemplary pharmacists,
- help students develop the ability to identify, prioritize, and solve real-world patient and medication use system problems,
- encourage the pursuit of excellence, including a spirit of inquiry and innovation,
- encourage each student to personalize their education by selecting elective curricular and co-curricular activities based on career goals,
- employ contemporary, evidence-based teaching and assessment strategies in ways that optimize student learning outcomes,
- consciously create a culture and learning environments that enhance student learning, and
- foster each student's personal and professional development, including their professional identity and professionalism.

Core Program-Level Goals and
Ability-Based Outcomes for Pharm.D. Education
College of Pharmacy
The Ohio State University

Executive Summary:

The primary mission of the OSU Pharm.D. program is to provide a professional education that enables students to become exemplary patient care providers who serve as the responsible *medication* experts in the healthcare delivery system. The purpose of this document is to define the set of program-level goals and ability-based outcomes that must be achieved to accomplish that mission.

The conceptual framework for Pharm.D. education described in this document results in six program-level goals:

Goal 1. Attitudes and behaviors - The graduate will exemplify the attitudes and behaviors of a professional healthcare provider.

Goal 2. Knowledge - The graduate will possess the knowledge that is required for exemplary pharmacy practice, including a comprehensive understanding of drugs and the determinants of drug action.

Goal 3. Component Skills - The graduate will possess the skills that are essential components of exemplary pharmacy practice.

Goal 4. Problem solving ability - The graduate will use a systematic process to identify and seek optimal solutions for patient and medication use system problems.

Goal 5. Providing direct patient care - The graduate will be able to provide exemplary medication-related patient-centered and population-based care, including care related to disease prevention and health promotion, acute illness or injury, chronic disease, and transitions of care.

Goal 6. Managing the medication use system - The graduate will be able to effectively contribute to the management of the human, physical, technological, and financial resources of the medication use system within which they practice to help assure the safety, effectiveness, efficiency, and cost-effectiveness of that system in meeting patient healthcare needs.

A total of 69 ability-based outcomes are defined for these six goals. The goals and outcomes are consistent with current draft ACPE accreditation standards, as well as other professional standards, guidelines, and codes, and provide a solid basis for curricular design and both student and program assessment.

Core Program-Level Goals and
Ability-Based Outcomes for Pharm.D. Education
College of Pharmacy
The Ohio State University

Preamble:

The primary mission of the OSU Pharm.D. program is to provide a professional education that enables students to become exemplary patient care providers who serve as the responsible medication experts in the healthcare delivery system. The purpose of this document is to define the set of program-level goals and ability-based outcomes that must be achieved to accomplish that mission.

To graduate exemplary patient care providers, the program must provide learning experiences that enable students to develop three essential, interacting elements of patient care: professional attitudes and behaviors, requisite knowledge, and essential component skills. However, developing these three elements is not sufficient. The program must also provide learning experiences that enable students to develop the ability to identify, prioritize, and solve patient care-related problems. This problem solving ability includes the ability to integrate and apply attitudes and behaviors, knowledge, and skills to patient care, as well as the ability to think critically and creatively, and to make good decisions. Students who possess the three essential elements and have the ability to integrate and apply them to solve patient care-related problems have the prerequisites for providing exemplary patient care. This idea, illustrated in Figure 1 on the next page, provides the conceptual framework for the six goals of Pharm.D. education at The Ohio State University and the ability-based outcomes associated with each.

The learning outcomes in this document have several important characteristics. First, they are ability-based outcomes. This means that each outcome is an explicit statement of what students will be able to do as a result of Doctor of Pharmacy education at The Ohio State University, rather than exactly what they need to know or what skills they need to possess to do it.

Second, the learning outcomes in this document are program-level outcomes. They represent targeted student abilities upon completion of the curriculum as a whole, rather than as a result of completion of a single course or course sequence. Students are expected to achieve increasing levels of mastery of the outcomes as they progress through the curriculum. By graduation, all students will be able to competently perform the activities described by the outcomes at the level of a generalist, entry-level pharmacist.

Third, the learning outcomes are written with the understanding that a standard of excellence applies throughout. Modifiers such as “effectively”, “high quality”,

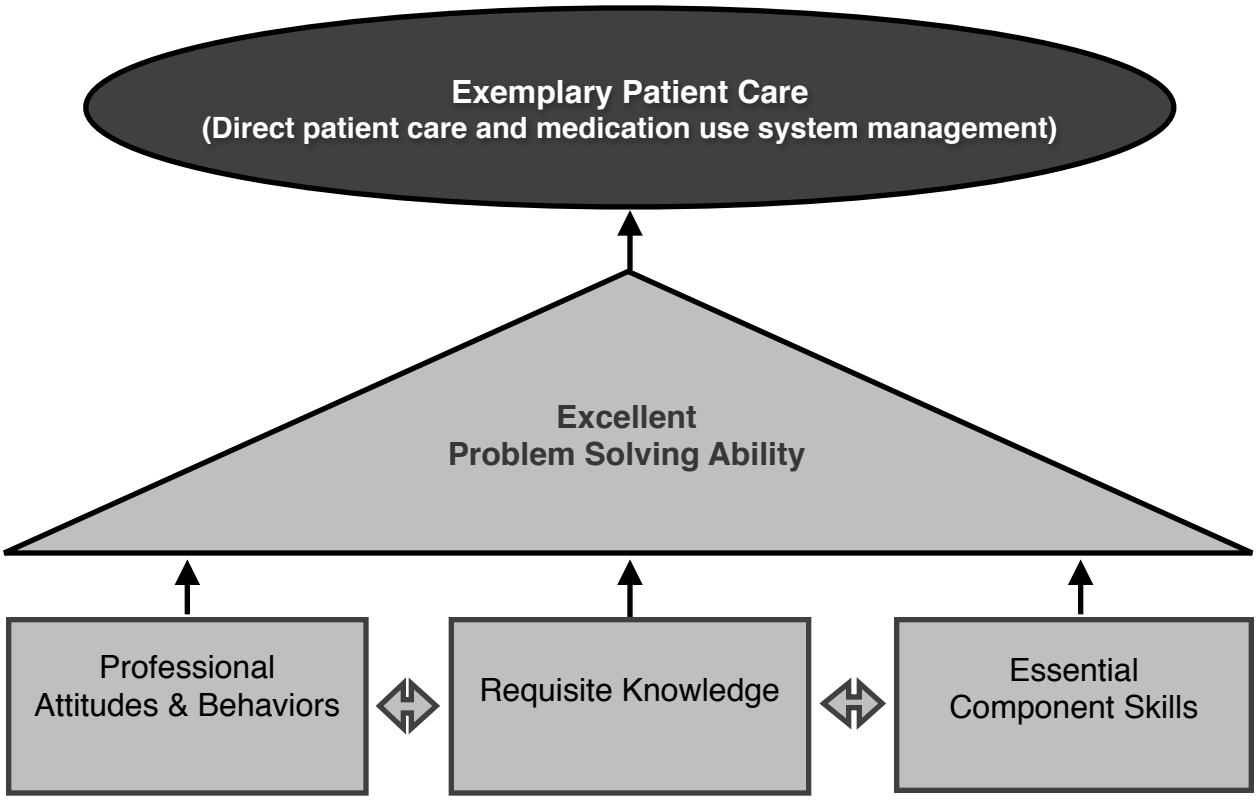

Figure 1. Conceptual framework for the goals of Pharm.D. education at The Ohio State University and their associated ability-based outcomes.

"appropriately", and "accurately" are therefore not included unless they were deemed important to understanding the outcome.

Understanding and optimal use of the goals and ability-based outcomes require that everyone shares a common understanding of the various words and phrases used. Definitions of key terms are therefore provided in the glossary (Appendix A). Words and phrases included in the glossary are italicized in the document.

Many resources impacted the creation of this document. Key resources are included in the bibliography to acknowledge their contributions (Appendix B).

The program-level goals and ability-based outcomes presented in this document are intended to provide a solid basis for curricular design and both student and program assessment. These goals and outcomes should guide what is taught and what is assessed in the Doctor of Pharmacy program.

Finally, while preparing exemplary patient care providers is the primary mission of Doctor of Pharmacy education, the program also provides an avenue by which students may begin to prepare for other career opportunities. The program therefore aspires to foster interest in the creation of new knowledge to enhance patient health outcomes and quality of life and to prepare students for advanced pharmacy education.

GOAL 1. ***Attitudes and behaviors*** - The graduate will exemplify the attitudes and behaviors of a professional healthcare provider.

As evidence of having achieved this goal, the graduate will be able to

1.1. exhibit *integrity*, including the core values of honesty, respect, excellence, responsibility, duty, altruism, and courage, in all personal and professional activities.

1.2. strive to consistently use the *habits of mind* during important personal and professional activities.

1.3. exhibit *self-awareness*, including an understanding of how their knowledge, skills, thoughts, feelings, attitudes, and behaviors impact their personal and professional performance.

1.4. exhibit *empathy* and *compassion* in all interactions with patients, family members, and members of the professional community.

1.5. exhibit a commitment to enhancing personal and professional competence through continuous learning and *reflective practice.*

1.6. practice pharmacy in accordance with state and federal laws, ethical standards, best practices, and established processes.

1.7. engage with professional organizations and the broader community.

GOAL 2. ***Knowledge*** - The graduate will possess the *knowledge* that is required for exemplary pharmacy practice, including a comprehensive understanding of drugs and the determinants of *drug action*.

As evidence of having achieved this goal, the graduate will be able to

2.1. explain concepts, principles, and facts from the *biomedical*, *pharmaceutical*, *behavioral and social*, *administrative*, and *clinical sciences*; *research design*; and *biostatistics* that are essential to exemplary pharmacy practice.

2.2. continuously update and refine their *knowledge*.

2.3. recognize when their *knowledge* is insufficient and use appropriate resources to satisfy their need for additional *knowledge*.

GOAL 3. ***Component Skills*** - The graduate will possess the skills that are essential components of exemplary pharmacy practice.

As evidence of having achieved this goal, the graduate will be able to

3.1. communicate effectively orally and in writing.

3.2. document patient care activities accurately, clearly, and concisely.

3.3. use patient health records to access, document, and exchange information.

3.4. take a patient health history, including a *medication* history.

3.5. explain how a patient's beliefs, norms, and other contextual variables can impact their *care plan*.

3.6. perform physical examination procedures.

3.7. perform point-of-care laboratory and diagnostic tests.

3.8. read and interpret laboratory and diagnostic test reports.

3.9. find, manage, interpret, and apply drug- and disease-related information, scientific literature, practice guidelines, and evidence-based best practices to the care of patients.

3.10. identify and manage potential adverse drug events and drug interactions associated with the addition, adjustment, or discontinuation of *medications*.

3.11. educate an individual or group of individuals to address their learning needs and assure their understanding.

3.12. identify and develop strategies for overcoming barriers to health behavior change, including barriers to adherence and lifestyle modification.

3.13. perform *medication reconciliation* during *transitions of care*.

3.14. use *health information technology*, including *health information exchange,* as part of patient care.

3.15. receive and interpret electronic, written, and verbal *medication* orders.

3.16. perform calculations required to compound, dispense, and administer *medications*.

3.17. compound and prepare extemporaneous preparations and sterile products.

3.18. prepare, package, and label *medications* for administration or dispensing.

3.19. access, interpret, and apply pharmacy benefit plans.

3.20. administer *medications*.

3.21. contribute to the maintenance of a formulary, including the development of *medication use criteria* and policies.

3.22. perform *medication use evaluations*.

3.23. assure proper and safe *medication* storage.

3.24. read and interpret a financial statement.

GOAL 4. *Problem solving* ability - The graduate will use a systematic process to identify and seek optimal solutions for patient and medication use system problems.

As evidence of having achieved this goal, the graduate will be able to

4.1. describe and routinely use a systematic *problem solving process*.

4.2. identify and clearly define a problem, including all relevant *contextual factors* and the goal(s) of solving the problem.

4.3. identify potential solutions for a problem.

4.4. evaluate the potential solutions for a problem and select the best solution.

4.5. implement the best solution for a problem in a manner that takes relevant contextual factors into account.

4.6. evaluate the outcomes of an implemented solution for a problem and respond appropriately.

4.7. reflect on a solution implemented for a problem and the resulting outcomes to improve future performance.

4.8. employ strong *critical thinking*, *creative thinking*, and *decision making* during the *problem solving process*.

4.9. integrate and apply professional *attitudes and behaviors*, requisite *knowledge*, and essential *component skills* during the *problem solving process*.

4.10. compare and contrast the *problem solving process* and *patient care process*.

GOAL 5. Providing *direct patient care*. - The graduate will be able to provide exemplary *medication*-related *patient-centered* and *population-based care*, including care related to disease prevention and health promotion, acute illness or injury, chronic disease, and *transitions of care*.

As evidence of having achieved this goal, the graduate will be able to

5.1. assure the safe, accurate, and efficient preparation and distribution of *medications*.

5.2. establish and maintain *covenantal relationships* with patients.

5.3. systematically use the *patient care process* to provide *patient-centered care*.

5.4. collect and organize relevant patient information using health records and clinical skills.

5.5. assess patients to identify and prioritize their health and *medication*-related problems.

5.6. develop, implement, and document a patient-centered *care plan* to manage patients' *medication*-related problems.

5.7. demonstrate sound clinical judgment when the best course of action is unclear based on currently available evidence.

5.8. assess the *medication*-related healthcare needs of a targeted patient population and develop an evidence-based program to address those needs.

5.9. participate as an integral member of *interprofessional healthcare teams*.

5.10. provide *leadership*, helping healthcare teams create and achieve shared goals regardless of position.

5.11. serve as a *patient advocate*, representing the patient's best interests in all patient care activities.

5.12**.** use *innovation* and *entrepreneurial skills* to identify and take advantage of opportunities to improve the practice of pharmacy and enhance patient outcomes.

GOAL 6. Managing the *medication use system* - The graduate will be able to effectively contribute to the management of the human, physical, technological, and financial resources of the *medication use system* within which they practice to help assure the safety, effectiveness, efficiency, and cost-effectiveness of that system in meeting patient healthcare needs.

As evidence of having achieved this goal, the graduate will be able to

6.1. plan and manage a project.

6.2. understand and apply the policies and procedures of a pharmacy practice.

6.3. manage the drug selection, procurement, and inventory processes.

6.4. contribute to the appropriate and safe use of automated systems for drug dispensing and administration.

6.5. supervise pharmacy technicians' *medication* preparation and delivery activities.

6.6. identify, assess, and resolve potential or existing *medication* safety issues.

6.7. assess the cost-effectiveness of a patient care service or a specific therapeutic approach to a medical problem.

6.8. develop a new pharmacy practice or service, including a *business plan*.

6.9. configure workspaces and workflows that enable practices to provide safe, effective patient care in an efficient, cost-effective manner.

6.10. communicate and collaborate with prescribers, patients, caregivers, other healthcare providers, and administrative and support personnel to identify and resolve problems related to the medication use system.

6.11. provide *leadership*, helping a practice or business management team create and achieve shared goals regardless of position.

6.12. serve as a *patient advocate*, representing the patient's best interests in all management activities.

6.13**.** use *innovation* and *entrepreneurial skills* to identify and take advantage of opportunities to improve the practice of pharmacy and enhance organizational outcomes.

APPENDIX A: GLOSSARY

Ability - the capacity to do something successfully.

Attitude and behaviors - a complex mental state involving beliefs, feelings, values, and dispositions to act in certain ways and the resulting behaviors (e.g., having and exhibiting empathy and compassion for patients).

Biostatistics - a branch of mathematics that deals with the collection, analysis, interpretation, and presentation of biological data. (adapted from online Merriam-Webster dictionary definitions of statistics and biostatistics)

Business plan - "a formal statement of a set of business goals, the reasons they are believed attainable, and the plan for reaching those goals… There is no fixed content for a business plan. Rather, the content and format of the business plan is determined by the goals and audience. A business plan represents all aspects of business planning process declaring vision and strategy alongside sub-plans to cover marketing, finance, operations, human resources as well as a legal plan, when required." (from www.en.wikipedia.org/wiki/Business_plan, accessed 09-08-2014)

Care plan - a plan for managing a patient's healthcare problems. A pharmacist's care plan typically includes planned/recommended pharmacological interventions, nonpharmacological interventions, patient monitoring, and patient education for each of the patient's medication-related problems.

Compassion - having empathy for another person and, in addition, having the desire to take action to help that person. Compare with "empathy." "Empathy" might briefly be defined as "I feel what you feel", while "compassion" might be defined as "I feel what you feel and act skillfully to relieve your suffering if I can, or sit with you if you just need accompaniment in your pain (or joy)." (empathy vs. compassion comparison adapted from www.huffingtonpost.com/cindy-wigglesworth/empathy_b_2796460.html, accessed 09-08-2014)

Component skill - a discrete task or ability, the performance of which can be learned through experience and training, which is a component of the process of providing patient care. Examples include taking a blood pressure, taking a medication history, and communicating with clarity and precision.

Contextual factors - the circumstances that form the setting for an event, statement, or idea, and in terms of which it can be fully understand and assessed. (from www.oxforddictionaries.com) In the context of patient care, this would include factors such as the the patient's cultural beliefs, health literacy, social support system, insurance status, barriers to health behavior change, etc., as well as external factors such as the site of care.

Covenantal relationship - professional obligation between a pharmacist and a patient characterized by reciprocity between the two parties. "Considering the patient-pharmacist relationship as a covenant means that a pharmacist has moral obligations in response to the gift of trust received from society. In return for this gift, a pharmacist promises to help individuals achieve optimum benefit from their medications, to be committed to their welfare, and to maintain their trust." (quotation from *APhA Code of Ethics for Pharmacists, accepted 1994*)

Creative thinking - both the capacity to combine or synthesize existing ideas, images, or expertise in original ways and the experience of thinking, reacting, and working in an imaginative way characterized by a high degree of innovation, divergent thinking, and risk taking. (Association of American Colleges and Universities, 2010)

Critical thinking - the habit of mind characterized by the comprehensive exploration of issues, ideas, artifacts, and events before accepting or formulating an opinion or conclusion. (Association of American Colleges and Universities, 2010.) Core cognitive critical thinking skills include interpretation, analysis, evaluation, inference, explanation, and self-regulation. ("The Delphi Report" on Critical Thinking, American Philosophical Association, 1990.) Critical thinking also includes a dispositional dimension, with defined affective characteristics that dispose a person to use cognitive critical thinking skills appropriately. Good critical thinkers possess the cognitive critical thinking skills and some or all of the affective dispositions. ("The Delphi Report" on Critical Thinking, American Philosophical Association, 1990.)

Decision making - the action or process of making decisions, especially important ones. (from www.oxforddictionaries.com)

Direct patient care - care delivered directly to a patient by healthcare provider, either as an individual or as part of a healthcare team. Note: This is intended to be a broad definition of direct patient care in keeping with the Draft ACPE Accreditation Standards 2016 and in contrast to the American College of Clinical Pharmacy's more restrictive definition.

Drug action - the effects of a drug in the body, including the physical, biological, and chemical determinants of those effects. In this document, "explain drug action" means the ability to explain the pharmacokinetic and pharmacodynamic basis of a drug's effect(s) in specific situations.

Empathy - the ability to be aware of, to understand and to appreciate the feelings and thoughts of others. Empathy is "tuning in" (being sensitive) to what, how and why people feel and think the way they do. Being empathic means being able to "emotionally read" other people. Empathic people care about others and show interest in and concern for them. It is the ability to non-judgmentally put into words your understanding of the other person's perspective on the world, even if you do not agree with it, or even if you find that perspective ridiculous. Being empathic

shifts an adversarial relationship to a collaborative relationship. (from Stein SJ and Book HE. THE EQ EDGE: Emotional Intelligence and Your Success. Jossey-Bass, Mississauga, ON, Canada, 2006) Compare with "Compassion."

Entrepreneurial skills - skills that entrepreneurs effectively exhibit, such as decision making, strategic thinking, risk taking, confidence building, communicating ideas, motivating team members, tolerance of ambiguity, and taking responsibility for actions (CAPE Outcomes 2013). An entrepreneur is a person who organizes and manages any enterprise, especially a business, usually with considerable initiative and risk (from www.dictionary.com).

Habits of mind - intellectual behaviors "intelligent people use when they are confronted with problems, the resolutions to which are not immediately apparent." They currently include the following:

1. Persisting
2. Managing impulsivity
3. Listening with understanding and empathy
4. Thinking flexibly
5. Thinking about thinking (metacognition)
6. Striving for accuracy
7. Questioning and posing problems
8. Applying past knowledge to new situations
9. Thinking and communicating with clarity and precision
10. Gathering data through all senses
11. Creating, imagining, innovating
12. Responding with wonderment and awe
13. Taking responsible risks
14. Finding humor
15. Thinking interdependently
16. Remaining open to continuous learning

(adapted from Costa AL and Kallick B (eds). Learning and Leading with Habits of Mind: 16 Essential Characteristics of Success. ASCD, Alexandria, VA, 2008.)

Health information technology - the application of information processing involving both computer hardware and software that deals with the storage, retrieval, sharing, and use of health care information, data, and knowledge for communication and decision making. (from www.healthit.gov/policy-researchers-implementers/glossary, accessed 09-04-2014)

Health information exchange - the electronic movement of health-related information among organizations according to nationally recognized standards. The goal of health information exchange is to facilitate access to and retrieval of clinical data to provide safer, timelier, efficient, effective, equitable, patient-centered care. (from www.hrsa.gov/healthit/toolbox, accessed 09-04-2014)

Innovation - the act or process of introducing new ideas, devices, or methods (CAPE Outcomes 2013).

Integrity - adherence to moral and ethical principles (from www.dictionary.com). For purposes of this document, the core values associated with integrity are honesty, respect, excellence, responsibility, duty, altruism, and courage.

Interprofessional healthcare team - Two or more professions working together collaboratively. "Interprofessional" is contrasted with the term "interdisciplinary," which focuses on when two or more fields within the same profession interact. (adapted from CAPE Outcomes 2013)

Knowledge - facts, information, concepts, and theories acquired through education or experience.

Leadership - the action of leading a group of people or an organization. (from www.oxforddictionaries.com) Taking responsibility for helping a team create and achieve shared goals regardless of position (from CAPE Outcomes 2013) is a major focus of leadership in this document. Leadership involves inspiring others. It is a function of knowing yourself, creating a culture of trust and open communication, having a vision that is well communicated, empowering others, taking a broad view of situations, and forming strategic alliances. (from CAPE Outcomes 2013)

Medication - any substance, other than food, used in the prevention, diagnosis, alleviation, treatment, or cure of disease. (Stedman's Medical Dictionary, 27th edition). Used to include both prescription and nonprescription medications; vitamins and other nutritional supplements; botanical and nonbotanical natural medicines; and conventional and homeopathic medicines. Synonym: drug.

Medication reconciliation - the process of identifying the most accurate list of all medications that the patient is taking, including name, dosage, frequency, and route by comparing the medical record to an external list of medications obtained from a patient, hospital, or other provider. (from www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/7_Medication_Reconciliation.pdf)

Medication-related problems - potential or existing problems with respect to a patient's medication for a given health problem. Four types of medication-related problems can occur: indication-drug therapy mismatch, effectiveness, safety, and adherence problems.

Medication use criteria - explicit criteria defining appropriate and inappropriate use of a specific medication or class of medications.

Medication use evaluation - a performance improvement method that focuses on evaluating and improving medication-use processes with the goal of optimal patient outcomes. MUE may be applied to a medication or therapeutic class, disease state

or condition, a medication-use process (prescribing, preparing and dispensing, administering, and monitoring), or specific outcomes. (from ASHP Guidelines on Medication-Use Evaluation. Am J Health-Syst Pharm. 1996;53:1953-1955.)

Medication use system - the combination of interdependent processes that share the common goal of appropriate, safe, effective, and efficient provision of patient drug therapy. Major processes in the medication use system include selecting and procuring; storing; prescribing; transcribing and verifying/reviewing; preparing and dispensing; and administering and monitoring drugs/drug orders. (Cohen, 1999; Otero, 2003; AHA & HRET & ISMP, 2002; JCAHO, 2003).

Patient advocate - supporting and empowering patients to make informed decisions, navigate the system to get the health care they need, and build strong partnerships with providers while working toward system improvement to support patient-centered care. Patient advocates are dedicated first and foremost to the well-being of the patients they serve. (from Gilkey MB, Earp JAL. Defining Patient Advocacy in the Post-Quality Chasm Era. NC Med J 2009;70:120-124)

Patient care - a broad term that includes patient care in all of its dimensions: acute care, chronic care, and disease prevention and health promotion; patient-centered care and population-based care; direct patient care and management of the medication use system within which direct patient care is provided; and care delivered in any setting.

Patient care process - the patient-centered process pharmacist's use in collaboration with other providers on the healthcare team to optimize patient health and medication-related outcomes. Using principles of evidence-based practice, pharmacists 1) collect patient information, 2) assess the patient to identify and prioritize their health and medication-related problems, 3) creates a care plan to address each medication-related problem, 4) implements the care plan in collaboration with other healthcare providers and the patient or caregiver, and 5) monitors and evaluates the results of the care plan, making adjustments as needed. (adapted from Joint Commission of Pharmacy Practitioners: Pharmacists' Patient Care Process, May 29, 2014)

Patient-centered care - patient care that is respectful of and responsive to individual patient preferences, needs, and values, and ensures that patient values guide all clinical decisions. (2013 CAPE Outcomes)

Population-based care - a comprehensive care approach where practitioners assess the health needs of a specific population, implement, and evaluate interventions to improve the health of that population, and provide care for individual patients in the context of the culture, health status, and health needs of the populations of which the patient is a member. (2013 CAPE Outcomes)

Problem solving - the process of designing, evaluating, and implementing a strategy to answer an open-ended question or achieve a desired goal. (Association of American Colleges and Universities, 2010)

Problem solving process - the systematic process used to solve problems including 1) identifying and clearly defining the problem, including all relevant contextual factors and the goal(s) of solving it, 2) identifying all potential solutions, 3) evaluating the potential solutions and selecting the best solution, 4) implementing the best solution in a way to takes relevant contextual factors into account, and 5) evaluating the outcomes of the implemented solution and responding appropriately.

Reflective practice - professional practice that incorporates critical reflection as a cornerstone. "Reflection is the ability to think and consider experiences, perceptions, ideas, etc. with a view to the discovery of new relations or the drawing of conclusions for the guidance of future action. In other words, reflection enables individuals to make sense of their lived experiences through examining such experiences in context. Reflection, although a cornerstone of reflective practice, is not the only skill needed. Reflective practice is…the process of turning thoughtful practice into a potential learning situation which may help modify and change approaches to practice. Reflective practice entails the synthesis of self-awareness, reflection, and critical thinking." (portion in parentheses adapted from Thompson S and Thompson N. The Critically Reflective Practitioner. Palgrave Macmillan, New York, 2008.)

Research design - the detailed planning of a study to answer a research question.

Science - 1) a branch of knowledge or study dealing with a body of facts or truths systematically arranged and showing the operation of general laws. 2) systematic knowledge of the physical or material works gained through observation and experimentation. (www.dictionary.com)

> **Biomedical sciences** - sciences, such as anatomy, biochemistry, immunology, microbiology, pathology, and physiology, that deal with the application of the principles of the natural sciences to medicine.
>
> **Clinical sciences** - the integration and application of sciences such as the biomedical, pharmaceutical, and social/behavioral/administrative sciences and health informatics to patient care. Public health might be included as a clinical science or, alternatively, as a social science.
>
> **Natural sciences** - sciences, such as biology, chemistry, and physics, that deal with the objects, phenomena, or laws of nature and the physical world.
>
> **Pharmaceutical sciences** - the scientific disciplines, such as medicinal chemistry, natural products chemistry, pharmacology, toxicology,

pharmaceutics, biopharmaceutics, and pharmacokinetics, that collectively explain or seek to explain drug action.

Behavioral and social sciences - the sciences of behavior, including individual psychological processes and behavioral interactions, and the sciences of social interaction, including familial, cultural, economic, and demographic. The core areas focus on the understanding of behavioral and social processes and on the uses of these processes to predict or influence health outcomes or risk factors. (Association of American Medical Colleges. Behavioral and Social Science Foundations for Future Physicians: Report of the Behavioral and Social Science Expert Panel. November, 2011.) Public health, law, and ethics are sometimes included as behavioral and social sciences.

Administrative science - the organized body of knowledge that deals with optimal approaches to managing and being responsible for running a practice, business, or organization. Examples include financial management, healthcare administration, operations, marketing, and communications.

Self-awareness - an individual's knowledge and understanding of their knowledge, skills, thoughts, feelings, attitudes, and behaviors and how they impact their personal and professional performance.

Transitions of care - the movement of a patient from one setting of care (hospital, ambulatory primary care practice, ambulatory specialty care practice, long-term care, home health, rehabilitation facility) to another. (www.cms.gov/Regulations-and-Guidance/Legislation/EHRIncentivePrograms/downloads/8_Transition_of_Care_Summary.pdf) Note that in some institutions, transitions of care could include movement of the patient from one setting of care to another within the same institution.

APPENDIX B: BIBLIOGRAPHY

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Proposed Program-Level Module Descriptions

The module descriptions below are for the P1 year and have been arranged in the order in which they will be taught in the new curriculum. The modules have been designed by teams of faculty members in conjunction with curricular design experts. Each module includes a brief description, goals and learning objectives, duration and total student time assessments, and a content description.

Title: Transitions 1 – Entering Pharmacy School
Term: AU
Total student time (TST): 150 hrs
Module Duration: 3 weeks at 100% of TST

Description: This module will provide students with an orientation to pharmacy school as well as essential skills and tools for successful matriculation to the professional PharmD curriculum.

Module Goals:

A. Students will understand what resources are available to assist them in successful completion of the Doctor of Pharmacy program
B. Students will begin to develop the necessary self-awareness and strategies for success.
C. Students will have an understanding of the professional skills they will need to cultivate in order to be successful as a pharmacist.
D. Students will understand the critical role of the pharmacist in the patient-care team.

Module Learning Objectives:

A1. Students will recall how to access College and University policies.
A2. Students will apply College and University policies to their experience as a graduate professional student.
A3. Students will develop an appreciation of the structure and function of the curriculum.
A4. Students will recall how to access campus resources and services.
A5. Students will develop a personal/professional support network.
B6. Students will be able to create and employ a strategic study plan.
B7. Students will develop self-awareness through exploration of their StrengthsFinder profile.
B8. Students will develop strategies for time-management.
B9. Students will practice implementing a basic set of study skills and strategies.
B10. Students will practice goal-setting and tracking.
B11. Develop appropriate stress management techniques.
B12. Develop behaviors that promote personal well-being.
C13. Students will develop professional etiquette skills.
C14. Apply professionalism concepts to their own professional development plan.
C15. Participate in college-based or interprofessional teams to practice team interaction skills.
C16. Students will demonstrate strategies for a successful internship job search.
D17. Identify the role of the pharmacist in delivering patient care.
D18. Understand the elements of becoming a critical part of the patient-care team.
D19. Discuss contemporary issues related to pharmacy practice and patient care.
D20. Analyze the relationship of the pharmacy profession to other health care disciplines

Content Description:

Week 1

Financial Module (Financial Aid)
Career Development (Resume/CV)
Student Organizations Introduction
Study Skills
Professionalism (Responsibility and Integrity)

Week 2

Financial Module
Career Development
Student Organization Session 2
Career Development/Etiquette Lunch
Professionalism (Empathy and Excellence)

Week 3

Professionalism (Wellness)
Financial Module (Residency)
Student Organization Fair
Career Development

Title: Foundations in Pharmacy Administration-1 (FIPA-1)
Term: AU
Total Student Time: 150 hours total
Module Duration: 3 weeks at 100% of TST

Description: This module will provide students with an overview of the U.S. health care system, an introduction to the management of self and others, and pharmacy law.

Module Goals:

A. Understand the complex issues and forces within the U.S. health care system.
B. Understand the landscape and complexities of pharmacy within society.
C. Understand what is required of a pharmacist to function as a health care provider.
D. Understand how to operate effectively as a pharmacist in a variety of roles.

Module Learning Objectives:

A1) Define health care system terminology.
A2) Identify models of health care delivery.
A3) Describe the external and environmental factors that impact the delivery of health care.
A4) Discuss roles of other health care practitioners.
A5) Explain the pharmacist's role as a member of an inter-professional team.
A6) Identify opportunities for overlap with the US health care system and the pharmacist's impact on patient care.

B1) Describe historical events that have influenced the role of the pharmacist in the health care system.
B2) Explain the medication use system, including appropriate terminology.
B3) Describe the importance of the pharmacist's role in the medication use system including distributive functions.
B4) Identify the pharmacist's role in the safe distribution and use of medications.
B5) Describe the various settings within which a pharmacist can contribute to health care.
B6) Describe appropriate resources that can be utilized to best understand the health care system.

C1) Recognize Ohio Laws that relate to the practice of pharmacy.
C2) Recognize Federal Laws that relate to the practice of pharmacy.
C3) Define the requirements for becoming a pharmacy intern.
C4) Define and apply the ethical principles required of a practicing pharmacists.
C5) Informatics - EHR, claims adjudication, dispensing system software, MTM software, etc.

D1) Examine personal skills and abilities that would influence management roles (management of self).
D2) Describe the role of the pharmacist in a variety of pharmacy practice settings.
D3) Describe management skills that can be utilized when interacting in a pharmacy practice environment (management of others).

D4) Identify techniques that allow a pharmacist to function as a leader in a health care setting.

Content Description:

Week 1:

Health Care Systems, delivery models, Medication use system, and pharmacist's roles

Week 2:

State and Federal Laws; Ethical Principles; Informatics

Week 3:

Management principles and skills

Title: Introductory Professional Practice Experience (IPPE 1 and 2)
Term: AU/SP
Total Student Time: 120 hours, 4 hours per week on average
Module Duration: 27 weeks assuming at 5% of TST

Description: This is a two semester experience that enhances and complements the first professional year coursework. Students engage actively in community pharmacy experiences to learn the basics of workflow, prescription processing, patient counseling & education, operations, and basic patient care provided in a community pharmacy. The students will also complete hours in professional development of their choice and community health services. The Geriatric Experience in the course places students at independent living facilities or senior centers to interact with older adults. Students are divided into groups of 3-5 students and assigned a site for the experience, with one student serving as the team leader. This helps students develop questioning and listening communication skills that are foundational for gathering information, problem solving and further the understanding of patients and their environments.

Module Goals:

A. Students will understand basic pharmacy practice skills
B. Students will practice the fundamentals of communication
C. Students will learn foundational attitudes for pharmacy practice
D. Students will learn to interact with diverse populations
E. Students will learn to appreciate the value of professionalism
F. Students will learn to appreciate the value of service

Module Learning Objectives:

A.1. Identify roles in outpatient pharmacy workflow
A.2. Recognize processes for dispensing of outpatient pharmacy prescriptions
A.3. Recognize and apply applicable law related to pharmacy practice
A.4. Participate in a patient care service encounter (MTM, DSM)
A.5. Practice basic drug information skills in community pharmacy setting

B.6. Apply learned communication fundamentals to patient counseling encounters
B.7. Apply learned communication patient educational interventions
B.8. Demonstrate patient interviewing skills
B.9. Demonstrate ability to interact with health care professionals
B.10. Demonstrate ability to function effectively as part of a student group

C.11. Assume responsibility for patient care
C.12. Practice ethical decision making
C.13. Demonstrate empathy in patient interactions
C.14. Adapt knowledge and skills to practice settings (adaptability)

D.15. Adapt communication skills to meet needs of diverse populations
D.16. Apply communication skills in interactions with older adults

E.17. Identify student pharmacist role in pharmacy advocacy
E.18. Explain role of professional pharmacy organizations
E.19. Practice professional dress & etiquette and other principles of professionalism
E 20. Practice strategies for lifelong learning

F.21. Recognize the challenges in health care in underserved community settings
F.22. Identify role of pharmacy services in underserved community settings

Content Description:

1) 50 hours of community pharmacy experience
2) 10 hours of professional development
3) 10 hours of community health service
4) 24 hours of Geriatric Experience

Title: Integrated Patient Care Lab (IPCal) 1
Term: AU/SP
Total Student Time: 8 hours per week, 20% of TST
Module Duration: 27 weeks

Description: A series of authentic, hands-on experiences that enable students to master component skills that are essential for exemplary patient care and practice integrating those skills in simulated practice settings.

Module Goals:

A. Students will be able to accurately prepare, compound and dispense medications in the community setting
B. Students will be able to utilize drug information resources to solve pharmacy-related problems in the community setting
C. Students will contribute to course activities by working professionally, ethically and legally
D. Students will be able be able to utilize feedback and identify areas for self-improvement
E. Students will be able to communicate with patients and health care professionals in a community setting
F. Students will be able to demonstrate foundational knowledge of pharmacy practice

Module Learning Objectives:

1. Students will be able to accurately prepare and dispense a prescription in accordance with pharmacy laws and regulations
2. Students will be able to perform the necessary calculations to accurately prepare, compound and dispense a prescription
3. Students will be able to compound non-sterile dosage forms
4. Students will be able to select an appropriate dosage form and vehicle(s) for a compounded prescription
5. Students will be able to provide patient information specific to the compounded dosage form including storage information
6. Students will be able to assign a correct beyond use date for a compounded prescription
7. Students will be able to utilize pharmacy technology in the community setting
8. Students will be able to administer immunizations
9. Students will be able to identify selected drug related problems in the community setting
10. Students will be able to collect and interpret information from appropriate resources to answer drug information questions
11. Student will be able to access appropriate drug information resources to provide patient education
12. Students will be able select an appropriate OTC product and counsel a patient
13. Students will be able to demonstrate professional and ethical behavior when interacting with patients and health care professionals
14. Students will be able to display cultural sensitivity and awareness
15. Students will be able to make and defend ethical decisions
16. Students will be able to create, implement and modify goals for professional development
17. Students will be able to accept and incorporate feedback to improve pharmacy skills

18. Students will be able to recognize, correct and learn from errors
19. Students will be able to utilize open-ended and closed ended questions to elicit information from patients and health care professionals
20. Student will be able to communicate with patients and other health professionals at an appropriate pace, volume, tone, and using language that is appropriate for the audience
21. Students will be able to establish trust and respect with a patient and other members of the health care team
22. Students will be able to demonstrate appropriate non-verbal communication skills
23. Students will be able to manage a patient encounter (including, establishing an agenda, gathering necessary information, and concluding the encounter)
24. Students will be able to employ the teach-back method to ensure patient understanding
25. Students will be able to utilize appropriate methods (ISBAR) for communicating patient information to other health professionals
26. Students will be able to identify and use appropriate methods to document encounters with patients and health care professionals
27. Students will be able to communicate medication-related information to patient's and caregivers
28. Students will be able to recall brand and generic names and therapeutic classes of top 200 drugs
29. Students will be able to recognize and use appropriate medical terminology

Content Description:

Topics unique to IPCaL include:

- Introduction to patient care environments
- Pharmacy calculations
- Preparation and dispensing
- Extemporaneous compounding (non-sterile and sterile)
- Order verification
- Prescription verification (Product/Label)

Integration & application of material covered in Concepts in Patient Care Modules, Principles of Drug Action Module, Integrated Pharmacotherapy Modules and Medication Use System Modules:

- Law
- Prescription counseling
- OTC/Self-care counseling
- Interprofessional communication
- Medication history taking/reconciliation
- Integrated patient cases
- Documentation
- Physical assessment
- Informatics/EHRs
- Vaccine administration/selection
- Durable medical equipment
- Point of care testing
- Evidence Based Medicine

Title: Concepts in Patient Care – 1 (CIPC 1)
Term: AU
Total Student Time: 30 hours per week, 20 hours per week in class time and 10 hours per week outside of class time.
Module Duration: 6 weeks assuming 60% of total student time

Description: The first in a series of modules addressing concepts and skills that are essential components of exemplary patient care. This module focuses on oral and written communication and drug information skills in the context of using the patient care process to counsel patients regarding the selection and use of nonprescription medications

Module Goals:

1) Understand use of the patient care process
2) Understand use of the patient care process in self-care
3) Understand and appreciate the most commonly used nonprescription medications
4) Understand how to access medical and drug information
5) Learn the importance of effective patient communication
6) Learn the importance of effective culturally competent patient care
7) Grasp the important elements of gathering a patient-centered health history

Module Learning Objectives:

1) Describe the stepwise process used to assess and counsel a patient
2) Distinguish a patient that is a candidate for self-care versus one needing referral to a health care provider
3) Demonstrate effective communication tools to conduct a comprehensive patient assessment
4) Describe the stepwise process used to assess and counsel a self-care patient
5) Recognize the brand and generic names for the top 30 nonprescription drugs
6) Categorize the therapeutic class for the top 30 nonprescription drugs
7) Explain major counseling points to patients regarding the selection and use of nonprescription products for pain and fever; cold, cough, and allergy; heartburn and gastroesophageal reflux disease; and constipation and diarrhea.
8) Explain major counseling points to patients regarding the most commonly used prescription medications
9) Select the most appropriate medical and drug information resource for a targeted inquiry
10) Cite medical and drug information resources appropriately
11) Compose and deliver effective patient-directed communication for oral and written use
12) Determine the appropriate communication techniques for challenging patients and special populations
13) Demonstrate awareness of cultural factors that impact patient care
14) Determine the appropriate communication techniques for culturally competent patient care delivery
15) Collect a patient-centered health history, including a medication history, in the context of nonprescription medication selection and use

Content Description:

Week 1

Topics: Overview of the patient care process, communication techniques for various patient types, components of a patient interview and documentation

Assignments:

1) Students will be exposed to the foundations of conducting and documenting a patient interview
    - Basic patient
    - Culturally competent communication
    - Special populations modification (geriatric, pediatric etc)
2) Quiz over 30 nonprescription drugs - brand, generic, and therapeutic class

Week 2

Topics: Building from the foundation in week 1 – how to communicate in difficult situations, communication with special populations, how to conduct a comprehensive patient assessment

Assignments:

1) Use simulation exercises to practice empathetic and nonverbal communication
2) Quiz over 30 nonprescription drugs - brand, generic, and therapeutic class

Week 3

Topics: Expanding the patient care process to differentiate a self-care candidate vs. one needing referral, regulatory processes of self-care products vs. prescription products, communication techniques when part of a health team

Assignments:

1) Use patient care data to make decisions for referral or self-care
2) Quiz over 30 nonprescription drugs - brand, generic, and therapeutic class

Week 4

Topics: Drug information resources, how to find and cite resources, assessing and answering drug information questions

Assignments:

1) Drug information scavenger hunt activity
2) Bring one drug information request they have received from real experience to class
3) Use patient case to determine ultimate drug information question
4) Written drug information response with appropriate citation
5) Quiz over 30 nonprescription drugs - brand, generic, and therapeutic class
6) Exam over drug information

Week 5

Topics: Self-care management of pain and fever and cough, cold and allergies

Assignments:

1) Use patient cases and product examples for specific OTC topics
2) Quiz over 30 nonprescription drugs - brand, generic, and therapeutic class

Week 6

Topics: Self-care management of heartburn, GERD, constipation, and diarrhea as well as an introduction to commonly used herb and dietary supplements

Assignments:

1) Use patient cases and product examples for specific OTC topics
2) Quiz over 30 nonprescription drugs - brand, generic, and therapeutic class
3) Comprehensive exam over OTC self-care products

Title: Principles of Drug Action (PODA)
Term: AU/SP
Total Student Time: 17 hours per week in class, 17-20 hours per week outside of class time
Module Duration: 16 weeks 80% of TST

Description: An integrated, transdisciplinary exploration of the scientific basis of drug action from drug discovery to drug elimination.

Module Goals:

A. Understand the fundamental principles of medicinal chemistry, drug discovery, drug delivery, biochemistry, physiology, pharmacokinetics, natural products, toxicology and introductory pharmacology.
B. Appreciate how the basic pharmaceutical sciences apply to the contemporary practice of pharmacy
C. Rely upon principles of pharmaceutical science to solve practice-related problems

Module Learning Objectives:

1. Summarize key characteristics of each family of drug targets
2. Name important endogenous ligands for each family of drug targets
3. Explain the concepts of agonist, antagonist, inverse agonist, and allosteric modulator
4. Discuss the biology underlying dose response curves
5. Characterize the fundamental concepts of Medicinal Chemistry.
6. Predict the pharmacodynamics properties of a drug based on its structural characteristics and its interaction with molecular targets.
7. Determine the physicochemical properties of a drug based on its structural characteristics.
8. Identify the pharmacokinetic properties of a drug based on its structural characteristics.
9. Explain the toxicological properties of a drug based on its structural characteristics.
10. Identify contemporary and traditional drug design and development strategies for drugs.
11. Distinguish basic pharmacokinetic (PK) and pharmacodynamic (PD) terms
12. Classify the PK of drugs based on their clearance, volume of distribution, bioavailability, mechanism of elimination, and protein binding
13. Read, understand, and comprehend primary clinical pharmacokinetic literature
14. Characterize the fundamental functions and models of pharmacokinetics.
15. Explain pharmacokinetic parameters, and physical factors that determine them.
16. Differentiate the effects of normal and altered physiology on PK parameters.
17. Determine the effects of normal and altered pharmacokinetics on humans' responses to medications.
18. Design individualized dosing regimens that maximize drug efficacy and minimize toxicity
19. Characterize the fundamental definitions and tenets of toxicology.
20. Identify medication-related cellular, tissue, and organ-specific toxicities, including carcinogenesis
21. Explain the difference between types of drugs, including those from natural sources
22. Discuss the importance of evaluation parameters used for dietary supplements and herbal products such as quality control, quality assurance, safety and effectiveness
23. Distinguish the types and describe the advantages/ disadvantages of various dosage forms.
24. Evaluate the role that physicochemical properties play in the design and use of various dosage forms
25. Analyze the conditions that affect drug absorption

26. Differentiate between small molecule and protein-based drugs.
27. Understand basic tissue-level physiology
28. Recall basic organ system-level physiology
29. Describe fundamental genomic principles
30. Examine the genetic basis and corresponding biological mechanisms responsible for hypo- and hyperresponsitivity to pharmacologic agents.
31. Distinguish biochemical pathways from one another
32. Identify the role enzymes and proteins in drug function
33. Recognize regulation of signaling pathways
34. Understand molecular basis of physiologic and pathophysiologic processes
35. Discuss the role of drugs on physiology and pathophysiology
36. Relate tissue-level physiology to biochemistry and other courses as appropriate
37. Analyze and interpret drug degradation data.
38. Determine the factors that influence the solubility, stability, and dissolution of drugs from various dosage forms.
39. Compare various methods of drug delivery.
40. Delineate the role of metabolic conversion in medication toxicity
41. Link common medication toxicities to biochemical and tissue-level disruptions
42. Discuss the importance of pre-clinical standardization parameters used for dietary
43. supplements and herbal products to guarantee safety and efficacy.
44. Explain and evaluate methods and techniques used in quality control, quality assurance, and good manufacturing practices of dietary supplements and herbal products.
45. Apply principles of normal physiology to interpreting and predicting disease-related information.
46. Use numerical constants to dose response curves
47. Examine mechanism of drug action for selection of drugs, prodrugs, and drug formulations in the treatment and prevention of diseases: metabolic, physiologic, and toxicologic considerations.
48. Relate medications to predictable reproductive toxicology and teratogenesis
49. Differentiate types of pharmaceutical forms used in preparation of dietary supplements and herbal products, in patient care.
50. Identify how genomic principles apply to medical care of individuals and larger populations
51. Assess the contributions of genetic factors to inter-individual variability in drug response, and the potential for optimizing individual therapy.
52. Individualize drug therapy in any patient population given PK estimates for that population and knowledge of the disease state
53. Evaluate and interpret drug concentration-time data and make recommendations regarding dosage regimens
54. Relate biochemical pathways to clinical disease and simple therapeutics

Content Description:

Week 1

Basic Background: All of our students have had basic chemistry, organic chemistry, and a biology course. Students should be conversant with important chemistry and biology vocabulary and have a working knowledge of some concepts from these courses. We might have some kind of pre-course examination to verify competency. Background concepts include:

- biology and biochemistry
- cell physiology

Proteins Theme: As proteins are the working molecules for numerous cellular processes, it is important to understand what they look like and how their work is regulated. Concepts covered in this theme include:

- amino acids and related molecules
- proteins

Week 2

Proteins Theme: As proteins are the working molecules for numerous cellular processes, it is important to understand what they look like and how their work is regulated. Concepts covered in this theme include:

- amino acids and related molecules
- proteins

Week 3

Nucleotides / DNA Theme: DNA provides the code for proteins, and regulation of protein synthesis and location underpins all cellular and organ system function. Concepts covered in this theme include:

- Structures of nucleotides and nucleic acids
- Cell biology
- Drugs
- major classes of drug modifying genes: metabolic enzymes, drug receptors, drug transporters,

Week 4

Location and Communication Theme: Proper cell function is dependent on the various structural and workhorse components being in the correct place. A raft of communication (signaling) pathways control cell function. At an organ and at systems levels, communication is crucial to viability. Concepts covered in this theme include:

- membrane transport
- protein location
- storage
- signaling
- applications of carbohydrates: bacterial cell wall, blood type, peptidoglycan
- lipids: phospholipid structure, DPPC as lung surfactant
- complex lipids: sphingomyelins for myelin sheath, glycosphingolipids in TaySachs and Gauchers disease

Week 5

Energy Theme: Cell processes require energy. Organisms must store energy in times of plenty and utilize stores in times of famine. Concepts included in this theme include:

- Energy intake
- high energy molecules
- Fed versus fasting state

Week 6

Homeostasis Theme: Many parameters and activities of organism must be regulated within a narrow range. This is accomplished through the use of homeostatic mechanisms. Many of the symptoms of disease states occur because a homeostatic mechanism is not working correctly. Drugs are used to compensate. Concepts in this theme include:

- Homeostatic Mechanism Overview
- Drug actions and homeostatic systems
- Key homeostatic systems

Weeks 7-10

Drug Delivery Theme: In order to produce an effect drugs must reach the site of action. Physiochemical properties determine the factors necessary for the design and use of various dosage forms. Concepts in this theme include:

- biopharmaceutics
- The need for dosage forms
- States of Matter with a focus on binding forces and phase diagrams
- Physiochemical properties of Solutions
- Solubility
- Dissolution
- Drug stability in solution
- Rheology, Interfacial phenomena, and flocculation theory
- Emulsions
- Nanoparticles and liposomes
- Oligonucleotides
- Properties of Solids
- Tablets, hard gelatin capsules and soft gelatin capsules
- Modified release products
- drug absorption and delivery routes

Weeks (11-16)

Pharmacokinetic Theme: Dosing regimen design (how much and how often) is determined by what the body does to the drug. Concepts in this theme include:

- Volume of distribution
- Hepatic Clearance
- Renal clearance
- One compartment model
- Two-compartment model
- Continuous input
- Multiple dosing
- Non-linear kinetics
- Drug interactions
- Dosing regimen individualization

Title: Concepts in Patient Care – 2 (CIPC 2)
Term: SP
Total Student Time: 30 hours per week, 20 hours per week in class time and 10 hours per week outside of class time
Module Duration: 4 weeks

Description: The second in a series of modules addressing concepts and skills that are essential components of exemplary patient care. This module focuses on oral and written communication and drug information skills in the context of using the patient care process to counsel patients regarding the use) of prescription medications and selection of nonprescription medications, particularly in community and ambulatory care pharmacy settings.

Module Goals:

1) Understand the use and limitations of clinical practice guidelines in patient-centered care
2) Understand the role of pharmacy informatics in the patient care process
3) Grasp how to analyze drug information requests for application to patient care
4) Understand the role of public health policy to promote wellness and disease prevention
5) Understand the role of the pharmacist to apply health and wellness strategies for common disease states and health risk factors related to cardiovascular disease.
6) Understand the process of delivering pharmacy-based immunization program to patients

Module Learning Objectives:

1) Define what clinical guidelines are and how to find them
2) Describe how clinical guidelines are developed
3) Identify patients at risk for common and high impact conditions, including hypertension, hyperlipidemia, pre-diabetes, and tobacco use.
4) Understand how to conduct patient assessments for patients with cardiovascular risks
5) Understand and begin to apply clinical guidelines to care of patients with cardiovascular health risks in community and ambulatory care settings
6) Determine effective counseling on commonly used medications including antihypertensives, lipid lowering medications, and tobacco cessation products
7) Identify the limitations of clinical guidelines
8) Define what pharmacy informatics is
9) Understand how to apply pharmacy informatics in patient care
10) Develop a systematic approach to drug information requests
11) Understand the role of various public health agencies
12) Understand how public health agencies develop policies
13) Demonstrate how to navigate public health resources
14) Understand what the Transtheoretical Model of Change is
15) Demonstrate successful completion of the APhA Pharmacy-Based Immunization training program
16) Demonstrate appropriate documentation and communication skills to meet administrative and regulatory requirements of pharmacists providing immunization

Content Description:

Week 1
Topics: Overview of clinical guidelines and public health agencies, discussion and demonstration of pharmacy informatics, transtheoretical model of change and tobacco cessation management
Assignments:
1) Drug information on-call activity
2) Patient cases for tobacco cessation

Week 2
Topics: APhA Immunization Certificate course – self-study and live course, APhA Travel Health Advanced Training course –self-study and live course
Assignments:
1) Completion of APhA required material for respective courses

Week 3
Topics: Overview of cardiovascular disease (epidemiology, scope and impact) and cardiovascular risk factors (in addition to tobacco abuse), discussion and demonstration of global risk assessment techniques, and hypertension management (focus on Top 200 antihypertensives)
Assignments:
1) 1) Review of hypertension guidelines (JNC8)
2) Patient cases for hypertension (uncomplicated)

Week 4
Topics: Overview of hyperlipidemia and pre-diabetes as contributing risk factors for cardiovascular disease. Ongoing discussion and practice for risk assessment, and therapeutic management of conditions including therapeutic lifestyle management and drug management (focus on Top 200 medications)
Assignments:
1) 1) Review of hyperlipidemia guidelines, weight management guidelines, and diabetes screening. Discussion of early management of (pre-) diabetes
2) Patient cases for hyperlipidemia (primary prevention) and pre-diabetes.

Title: Transitions 2 (T2)
Term: SP
Total student time (TST): 38 hours
Module duration: 1 week 75% of TST

Description: This module will revisit key themes of wellness and professionalism in order to help students prepare for summer internships and IPPE summer community rotation.

Module Goals:

A. Explore career options
B. Revise and revisit personal wellness strategies
C. Continue interaction in interprofessional activities

Content Description:

1. Career planning – summer internships/fellowships
2. Interprofessional education events
3. Wellness planning
5. Summer IPPE overview and expectations

Title: Integrated Pharmacotherapy (IP)
Term: AU/SP
Total Student Time: 24 hours per week
Module Duration: Individual module duration within IP sequence TBD during future module level planning

Description: Integrated Pharmacotherapy (IP) is designed to help Pharm.D. students develop a rigorous understanding of the scientific basis for preventing and managing human health disorders, and the ability to integrate and apply that knowledge while providing exemplary medication-related patient-centered and population-based care.

IP consists of a series of modules, most of which focus on an organ system (e.g., the cardiovascular system) and the disorders that affect that system (e.g., hypertension). The modules are taught using an integrated approach that incorporates all of the biomedical, pharmaceutical, behavioral and social, administrative, and clinical sciences required to provide exemplary care for patients having or at risk of developing the disorders included in each module.

Module Goals:

1) Understand pathophysiology of disease states;
2) Examine how drugs exert their effects;
3) Use knowledge in foundational areas in the care of patients; and
4) Assimilate the attitudes, component skills, and problem-solving strategies required to optimize pharmacotherapy.

Module Learning Objectives:

1) Describe biochemical and physiological function of important body organs;
2) Identify causative agent/processes for relevant diseases;
3) Explain how body functions differ biochemically and physiologically between health and the diseased state;
4) Describe patient clinical presentation in disease states, including signs, symptoms and pertinent laboratory and diagnostic findings
5) Describe the classification of drugs;
6) Explain modern and conventional drug discovery/design concepts for relevant drugs, including prescription and over-the-counter (OTC) drugs, and herbals and dietary supplements;
7) Explain the relevant concepts of drug receptor/enzyme interactions and identify key molecular structural components required for the interactions;
8) Develop understanding of the physiochemical properties, stereochemistry and structure-activity relationships (SAR) of drugs;
9) Identify targets for drugs and how the interaction of drugs with their targets produces effects;
10) Explain the mechanism of action, use and adverse effects of drugs and drug classes used in treating disease states;
11) Analyze the dose-response relationship for important drugs related to disease states;
12) Differentiate between drugs within a class based on factors related to absorption, distribution, metabolism and elimination (ADME) and pharmacodynamics response.
13) Identify and explain important drug-drug interactions, both how they occur and strategies to manage;

14) Explain how drugs may be used to normalize physiological function or could manage risk factors associated with common disease states;
15) Determine which drug(s) or drug classes would be appropriate therapy for a disease state, including drugs which are not approved for or not regulated as standard therapies;
16) Select an appropriate drug or drug class based on specific patient characteristics;
17) Select routes of administration and mode of drug delivery based on desired therapy outcomes;
18) Identify sources of intra- and inter-patient variability in drug response;
19) Apply the patient care process to identify and solve medication-related problems;
20) Know and utilize clinical practice guidelines to optimize the approach to common disease states
21) Differentiate risk/benefits between potential drug therapies for given patients or populations of patients;
22) Examine/evaluate literature related to management of a specific patient with one or more disease states and treated with one or more drugs;
23) Evaluate patient outcomes related to specific disease state therapies;
24) Develop strategies to monitor and modify drug therapy plans for individual patients;
25) Decide when to use lifestyle interventions to prevent or manage health conditions, either with drug therapy or in place of it;
26) Decide when the risks of a drug therapy or therapies outweigh the benefits, and consider when non-pharmacologic options are preferable;
27) Value how patient belief systems and culture, health literacy, and access to resources may impact their care;
28) Propose team based approaches to drug selection and patient management;
29) Describe strategies to address pharmacotherapy needs at the individual and population level.

Content Description:

IP modules will address the following topics:

Cardiovascular Disorders
Pulmonary Disorders
Immunologic Disorders
Neurologic and Psychiatric Disorders
Infectious Diseases
Kidney and Urologic Disorders
Gastrointestinal Disorders
Hematologic Disorders
Endocrine Disorders
Musculoskeletal Disorders
Women's and Men's Health
Ophthalmologic Disorders
Dermatologic Disorders
Nutritional Disorders
Critical Care
Oncology

Detailed module level planning for all P2+ modules will being in Spring 2016. This includes all IP modules

Credit Hour Summary: Current Curriculum Comparsion with Proposed Curriculum

Credit Hours Current Program				
				Yearly totals
P1 Autumn		***P1 Spring***		
PHR 6001	1	PHR 6002	1	
PHR 6010	2	PHR 6020	2	
PHR 6050	4	PHR 6060	4	
PHR 6080	3	PHR 6090	3	
PHR 6210	3	PHR 6220	3	
PHR 6610	3	PHR 6620	3	
		PHR 6240	0.5	
		PHR 6260	1	
	16		17.5	**33.5**
P2 Autumn		***P2 Spring***		
PHR 7003	1	PHR 7004	1	
PHR 7110	2	PHR 7320	3	
PHR 7310	3	PHR 7480	7	
PHR 7470	8	PHR 7750	3	
PHR 7740	3			
	17		14	**31**
P3 Autumn		***P3 Spring***		
PHR 7005	1	PHR 7006	1	
PHR 7240	2	PHR 7007	2	
PHR 7490	7	PHR 7500	8	
PHR 7630	3	PHR 7860	4	
		PHR 7900	2	
	13		17	**30**
P4 Summer		P4 Autumn		
PHR 7008	0.5	PHR 7008	0.5	
PHR 7011	3	PHR 7013	3	
PHR 7012	3	PHR 7014	3	
		PHR 7015	3	
	6.5		9.5	
P4 Spring				
PHR 7008	0.5			
PHR 7016	3			
PHR 7017	3			
PHR 7018	3			
PHR 7019	3			
	12.5			**28.5**
			ELECTIVES	6
				TOTAL HOURS
				129
	Guaranteed hours			123
	(-electives)			

Credit Hours New Program				
				Yearly totals
P1 Autumn		***P1 Spring***		
Transitions 1	3	PODA 2	9	
FIPA 1	3	CIPC 2	3	
CIPC 1	4	IPCAL	3	
IPCAL 1	3	IPPE	1	
IPPE 1	1	Transitions 2/PLA	1	
PODA 1	4			
	18		17	**35**
P2 Autumn		***P2 Spring***		
CIPC 3	1	IPCAL	3	
IPCAL	3	IPPE	1	
IPPE	1	IP	8	
IP	8	Electives	3	
Electives	3	PLA	0.5	
	16		15.5	**31.5**
P3 Autumn		***P3 Spring***		
CIPC 4	1	IPCAL	3	
FIPA 2	3	IPPE	1	
IPCAL	3	IP	8	
IPPE	1	Electives	3	
IP	8	PLA	2	
Electives	2	FIPA 3	1	
	18		18	**36**
P4 Summer		P4 Autumn		
PHR 7008	0.5	PHR 7008	0.5	
PHR 7011	3	PHR 7013	3	
PHR 7012	3	PHR 7014	3	
		PHR 7015	3	
	6.5		9.5	
P4 Spring				
PHR 7008	0.5			
PHR 7016	3			
PHR 7017	3			
PHR 7018	3			
PHR 7019	3			
	12.5			**28.5**
			ELECTIVES	11
				131
		Guaranteed Hours		120
		(-electives)		

Program Level Assessment Plan

Context and Philosophy
Program-level assessments in the PharmD program are designed to assess student performance on the program-level ability based outcomes as well as demonstrating that students are achieving outcomes required by specialized accreditor the Accreditation Council for Pharmacy Education (ACPE).

Program-level assessment data will be used to improve student learning outcomes. Students will be assessed both by formative and summative methods and will be given the opportunity to remediate when their performance does not meet minimal standards.

Plan
Immediately prior to each intensive Introductory Pharmacy Practice Experience (IPPE) and immediately prior to the Advanced Pharmacy Practice Experience (APPE), students will complete program level assessments that will confirm achievement of the knowledge skills and abilities gained in the curriculum thus far.

Each of the 3 program-level assessments will have a comprehensive knowledge assessment as well as competency based assessment to determine achievement of program-level ability based outcomes.

Sample P1 Program-Level Assessment
1. Knowledge assessment
2. Simulated patient encounter using standardized patients
3. Pharmacy calculations assessment

Sample P2 Program-Level Assessment
1. Knowledge assessment
2. Simulated patient encounter(s) using standardized patients
3. SOAP (patient information) note assessment

Sample P3 Program-Level Assessment
1. Standardized National knowledge based assessment Pharmacy Curricular Outcomes Assessment (PCOA).
2. Capstone activities for example Community and Institutional objective structured clinical exams, therapeutic update presentations and top 200 drugs test.

APPENDIX III

Implementation: Data and Supporting Documents

THE OHIO STATE UNIVERSITY

College of Pharmacy

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500 West 12th Avenue
Columbus, OH 43210-1291

614-292-2266 Phone
614-292-2588 Fax

November 2, 2015

Katherine Kelley, Ph.D.
Associate Dean for Assessment and Strategic Initiatives
Associate Professor of Clinical Pharmacy

Dear Dr. Kelley,

I am providing this letter to indicate support for the proposed changes in the PharmD program. The college has capacity for the near term for the increased teaching and facilities needs identified in the proposal. In the longer term, additional teaching capacity will be garnered through already planned and budgeted faculty hires. The program will also provide additional revenue which will be adequate to cover lecturing and lab needs. Overall the changes will provide a positive financial impact to the college and ultimately to the university.

Sincerely,

Erin Delffs, MBA
Chief Administrative Officer
College of Pharmacy

Facilities and Space Considerations

The College administration is aware that the new curriculum will require different configurations of classroom spaces than the old curriculum. Instruction will be delivered in modules where students will immerse themselves in one integrated module at a time rather than the standard disciplinary course approach. In addition we are adding professional practice laboratory activities to the first and third years of the program, thus tripling this type of learning experience.

The following activities have been initiated:

1. Improvements to the College physical plant are an item in the strategic plan. This includes improvements to the classroom spaces.

2. An outside consultant was hired to review current space and propose changes to meet future needs.

3. A small team of faculty are working on plans for scheduling and expansion of spaces for the professional practice laboratory.

4. An additional team is looking at classroom spaces and needs.

Faculty Development Programming
2013-2015

In support of the PharmD curricular revision process and the College of Pharmacy's strategic plan, the college organized multiple faculty development opportunities regarding curricular change and teaching and learning methods. Events offered included:

- Presentations by visiting faculty members leading curricular change in Top 10 colleges and schools of pharmacy, including **Dr. Kristin Janke**, from University of Minnesota, **Dr. Mary Roth McClurg**, from University of North Carolina at Chapel Hill, and **Dr. Bruce Mueller** and **Dr. Burgunda Sweet**, from the University of Michigan. (October 2013 – July 2014)

- Small-group conference calls with **faculty members leading curricular change** in the PharmD programs at University of Minnesota, University of California San Francisco and the University of Florida. (September – December 2014)

- A contemporary teaching methods presentation delivered by **Dr. Dan Clinchot**, Vice Dean for Education at the Ohio State University College of Medicine. Dr. Clinchot spoke with college faculty about "Mastery-Based Education at the OSU College of Medicine." (December 12, 2014)

- Visiting assessment scholar **Dr. Doug Eder** presented "Thinking Critically About Designing Multiple Choice Tests." Dr. Eder has presented and published work in the areas of assessment and of student learning, and has been a member of the assessment community since its early days. He has worked with 140 institutions of higher learning, collaborating and advising on issues of assessment, program review and reaccreditation. He is a regular presenter at the Assessment Institute held annually at Indiana University Purdue University Indianapolis. (February 12, 2015)

- **Dr. Todd Zakrajsek**, Executive Director of the Academy of Educators in the School of Medicine at the University of North Carolina at Chapel Hill visited the college to deliver three presentations on teaching and learning topics: "Teaching for Student Learning: Using Habits of Mind to Frame Teaching and Learning," "Applications of Learning Theory to Support Effective Teaching: Concepts and Evidence," and "Overcoming Apathy and Motivating Students in the Learning Process." A scholar of curriculum design, effective teaching and student learning, Dr. Zakrajsek has delivered keynote addresses and presented workshops in more than 30 states and four countries. Additionally, he directs three national conferences on college and university teaching as well as an international teaching conference. He sits on two educationally related boards; and serves on the editorial board for the *Journal of Excellence in College Teaching*. Previously, he served as the inaugural director of the Center for Innovative Teaching at Central Michigan University and the founding director of the Center for Teaching and Learning at Southern Oregon University. (March 13, 2015)

- The College of Pharmacy sponsored a presentation given by **Dr. Eric Mazur,** Balkanski Professor of Physics and Applied Physics at Harvard University and internationally known scientist, researcher and scholar of science education and evidence-based teaching and learning techniques. Dr. Mazur presented "The Tyranny of the Lecture" to pharmacy faculty during his visit to the Ohio State University. (April 3, 2015)

- **Dr. Larry K. Michaelsen**, David Ross Boyd Professor Emeritus at the University of Oklahoma, Professor Emeritus at the University of Central Missouri, Carnegie Scholar, Fulbright Senior Scholar (three awards) and former editor of the *Journal of Management Education* conducted

three workshops over two days with faculty from the Colleges of Pharmacy, Nursing and Veterinary Medicine. Dr. Michaelsen shared strategies for implementing Team-Based Learning techniques through three workshops: "Designing Group Work that *Really* Works," "Getting *Beyond* Covering Content: A Key to Preparing Students for Their Future Professions," and "Turning Good Group Assignments into Great Ones." (April 30-May 1, 2015)

- **Summer 2015 Curriculum Design Institute**, facilitated by the University Center for the Advancement of Teaching and the College of Pharmacy. Five sessions were offered, covering topics related to backward design, curriculum and course development. (May-August 2015)

Faculty Support

In June of 2015, the College of Pharmacy hired a **Director of the Office of Teaching, Learning, and Assessment**. One of the key responsibilities of this new position is to oversee faculty development opportunities within the college, including training opportunities for integrated technology use. Faculty workshops will be provided on various forms of educational technology in order to increase college faculty knowledge. The position will also assist in the implementation of learning technology in both the PharmD and BSPS programs. In Spring 2016, the College of Pharmacy plans to hire an **instructional designer**, with the expectation that **an additional hire** may be made in the next six to twelve months. These hires will directly assist individual faculty members with technology implementation in individual courses, including expanded use of Carmen, Top Hat, and other emerging technologies adopted by the college like SoftChalk. They will fill two vacant college Technology Services instructional technology positions. Oversight is expected to shift to the new Office of Teaching, Learning, and Assessment. College of Pharmacy Technology Services expects to continue providing instructional support in conjunction with these new staff hires.

Additional Documents Available from the College of Pharmacy Upon Request

Thank you for reviewing this proposal for revision of the Doctor of Pharmacy program. Additional documentation of the revision process through each of its stages is available upon request from the College of Pharmacy. For copies of any of these materials, please contact Dr. Katherine Kelley, Associate Dean for Assessment and Strategic Initiatives, kelley.168@osu.edu.

Current Curriculum

Ability Based Outcomes, current curriculum

Doctor of Pharmacy electives, current curriculum

Academic Progression Guidelines, current curriculum

Doctor of Pharmacy Honor System, current curriculum

Doctor of Pharmacy Technical Standards, current curriculum

Revised Curriculum

ACPE Standards 2016 Appendix I: Required Elements of the Didactic Doctor of Pharmacy Curriculum

ACPE Standards 2016 Appendix II: Expectations Within the APPE Curriculum

Proposed Weekly Schedule, revised curriculum

AACP PharmD Degree Programs Anticipated for 2015-16

Roster of faculty, staff, students and partners involved in curricular revision

Meeting Minutes

College of Pharmacy Curricular Change Task Force Meeting Minutes

Curricular Change Task Force Steering Team Meeting Minutes

PharmD Program Committee Meeting Minutes

Integrated Pharmacotherapy Modules Selection and Sequencing Group Meeting Minutes

College of Pharmacy Faculty Meeting Minutes pertinent to PharmD curricular revision process

College of Pharmacy Dean's Corporate Council Meeting Minutes pertinent to PharmD curricular revision process