



# Creating a Comprehensive Exam to Prepare Students for the PCOA.

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## Objective

The objective of this project was to provide Maryland pharmacy students with the experience of a comprehensive examination similar in length and content to the PCOA.

## Background

When the PCOA was required as part of ACPE Standards 2016, we discussed how best to introduce our PharmD students to comprehensive testing. The conversations went like this:

- Will our students stress out over taking a comprehensive conceptual level exam? A practice test experience may help to calm nerves (both theirs and ours) before the one that “counts”.
- How will we create a 3 hour exam without overburdening the faculty? We should generate a practice exam using the ExamSoft question bank. Who will tag all those questions?
- Where will it fit in the curriculum (and the schedule) “near the end of the didactic curriculum,” late fall or early spring of P3?
- What will we do with the cohort data, and what will students do with their own results? Individual results can be returned via ExamSoft to students for self-reflection, and class-wide results will inform review sessions and quizzes.



## Methods

The Office of Academic Affairs mined our ExamSoft question bank and pulled some 300+ previously tested questions written by Maryland faculty within predetermined ranges of **point biserial (+0.2 to +0.4) and item difficulty (>70%)**. These questions were screened by senior faculty for high level concepts rather than lecture specific details, and 225 questions were selected then **tagged according to the PCOA blueprint’s 4 topics and 28 subtopics**.

We **pilot-tested the exam with nine residents**, some of whom were PharmD graduates of the University of Maryland School of Pharmacy, and garnered their feedback on the exam construction and content. Based on their comments, questions were tweaked to define abbreviations, broaden conceptual level of detail, and clarify ambiguities in the text. Residents also questioned the practice relevance of a comprehensive exam of which nearly half is basic science content, since the stated purpose was to determine readiness for APPE rotations.

The **practice exam was delivered to P3 students in ExamSoft** at the start of the spring 2016 semester so that students could experience the pressure conditions of a three-hour seated, proctored, timed, computer-based assessment.

## Results

Area 1 - Basic Biomedical Sciences (16%) ~ 36 questions  
 Area 2 – Pharmaceutical Sciences (30%) ~ 68 questions  
 Area 3 – Social/Behavioral/Administrative Sciences (22%) ~ 50 questions  
 Area 4 – Clinical Sciences (32%) ~ 72 questions

After the practice PCOA, students received Strengths and Opportunities reports in ExamSoft for self-reflection, and review sessions were held for the lowest-scoring topics. Issues identified by the Office of Academic Affairs include a shortage of questions in physiology and clinical pathophysiology in our clinically-focused PharmD curriculum, as well as lower than expected cohort performance in pharmacokinetics and pharmacology.

The curriculum committee evaluated the cohort results, recommended continued use of the practice PCOA as well as investigation of reliability and validity (with dedicated resources), and suggested that faculty consider using a variety of question formats used in the PCOA to increase student familiarity.

	Practice PCOA # Items	PCOA # Items
<b>BASIC BIOMEDICAL SCIENCES</b>		
1A Physiology	4	10
1B Biochemistry	10	8-9
1C Microbiology	5	4-5
1D Molecular Cell Biology/Genetics	14	4-5
1E Immunology	3	4
<b>PHARMACEUTICAL SCIENCES</b>		
2A Medicinal Chemistry	14	11-12
2B Pharmacology and Toxicology	30	15-16
2C Pharmacognosy and Alternative & Complementary Treatments	-	2
2D Pharmaceutics	4	13-14
2E Biopharmaceutics/Pharmacokinetics	8	9-10
2F Pharmacogenomics	2	0-1
2G Extemporaneous Compounding/Parenteral/Enteral	10	7
<b>SOCIAL/BEHAVIORAL/ADMINISTRATIVE PHARMACY SCIENCES</b>		
3A Health Care and Public Health Delivery Systems	9	7
3B Economics/Pharmacoeconomics	5	3-4
3C Pharmacy Management	6	6
3D Pharmacoepidemiology	6	1
3E Pharmacy Law and Regulatory Affairs	8	5
3F Biostatistics and Research Design	4	5
3G Ethics	4	1-2
3H Core Communication Concepts and Skills	2	6
3I Social and Behavioral Aspects encountered in Practice	4	2
3J Medication Dispensing and Distribution Systems	1	6-7
<b>CLINICAL SCIENCES</b>		
4A Literature Evaluation – Practice Guidelines and Clinical Trials	7	7-8
4B Drug Information	-	6
4C Clinical Pathophysiology	7	19
4D Clinical Pharmacokinetics/Pharmacogenomics	2	5-6
4E Clinical Prevention and Population Health	9	5
4F Medication Therapy Management - Patient Assessment, Clinical Pharmacology, and Therapeutics	47	21

## Implications

Some correlation was seen in cohort performance on the practice PCOA and the PCOA, although more data is needed. Results are sure to change if the PCOA is used as a high-stakes assessment by the school and/or ACPE.

NABP should provide NAPLEX subtopic data at the same level of granularity as the PCOA so that schools and students can better focus their preparation for the licensing exam.