

## General Information

### What is the Pharmacy Curriculum Outcomes Assessment<sup>®</sup> (PCOA<sup>®</sup>)?

The PCOA is a 220 item multiple-choice paper-and-pencil measurement tool that has been developed by the National Association of Boards of Pharmacy<sup>®</sup> (NABP<sup>®</sup>) to assess curriculum outcomes across time. The PCOA is intended to be a valuable and integral component of the process that schools use to assess their curricula. The data obtained from the PCOA will provide participating colleges and schools of pharmacy with detailed feedback related to the subject matter covered throughout the professional pharmacy curriculum. Data can also be used to provide detailed information to individual students on their strengths and weaknesses in regard to the curriculum. Because the PCOA is administered on an annual basis, resulting data are both formative and summative in measuring student progress and allow comparisons to be made to a national reference group.

### Why is the PCOA needed?

The colleges and schools of pharmacy have expressed a need for a national assessment that is psychometrically validated to assist with measuring curriculum development and student performance. The PCOA is similar to medical in-service examinations that are administered annually across years of study in order to evaluate progress. The PCOA can be used:

- To measure the overall performance of pharmacy students and compare their scores to a representative national sample of students
- As a tool for faculty to provide constructive feedback on the strengths and weaknesses of the student and to track individuals' scores from year to year and individual growth over time
- To document improvement in student performance after the school's curriculum has been modified or updated
- For research and correlational studies with existing assessments such as Pharmacy College Admission Test (PCAT) scores, current grades, and future North American Pharmacist Licensure Examination<sup>®</sup> (NAPLEX<sup>®</sup>) administrations
- As a component and outcome measure of the evaluation plan suggested by the Accreditation Council for Pharmacy Education (ACPE) Standards. As such, the PCOA:
  - Has formative and summative measures
  - Provides for collective analyses of findings
  - Evaluates trends over time
  - Includes standardized instruments and data analyses
  - Documents that the school is providing the scientific foundation necessary for achievement of the professional competencies

# PCOA FREQUENTLY ASKED QUESTIONS

## Assessment Development

### How was the PCOA developed?

The PCOA was developed using gold-standard test development principles and psychometrics. A full report of its development can be found in the Validity and Reliability Evidence for the Pharmacy Curriculum Outcomes Assessment, which is available from NABP upon request.

Content of the assessment is based upon a blueprint that was derived from the ACPE *Accreditation Standards and Guidelines for the Professional Program Leading to the Doctor of Pharmacy Degree*. NABP convened a select committee of 11 stakeholders who collected curriculum data from 55 accredited United States pharmacy programs. The committee estimated the average number of curriculum hours that were allocated to the different areas of the new draft blueprint for each of the 55 schools in the sample, and used those averages to establish proportions upon which the number of questions in the PCOA should be assigned. These results were incorporated into a survey instrument sent to all US schools and colleges of pharmacy. Constructing the survey in this way utilized the number of credit hours allocated to the topics in the pharmacy schools' curriculum and created a draft blueprint that would result in an assessment that reflected the relative emphasis of the various topics.

In March 2006, this survey instrument was sent to deans of all the schools and colleges of pharmacy, asking for their recommendation on the number of questions that should be allocated to the delineated topics. Surveys were obtained from 41 accredited pharmacy programs. Since the survey had a high response rate and its results corresponded so closely with the overall assessment of curricular requirements across US schools and colleges of pharmacy, the results of the survey were adopted directly for the PCOA blueprint. Statistical and psychometric analyses were completed on the 2007 pilot PCOA and the 2008 and 2009 operational administrations, and the evidence demonstrated that there is high level of confidence in the reliability and validity of the assessment, in its scores, and in its inferences about the abilities of students and the effectiveness of a school's curriculum. In summary, these analyses showed:

- The direct and precise linkage of the PCOA content to its blueprint
- High reliability indices, which show that the total assessment and the content areas consistently and reliably measure pharmacy knowledge and skills
- High internal reliability index shows that the items measure a single dimensional construct
- That the exploration of the goodness-of-fit confirmed that the assessment scale supports construct validity
- Inter-scale correlations that indicated that there is some commonality between the content areas, but that each content area also brings its own uniqueness to the assessment
- That the assessment behaves as expected as evidenced by examining the increase in pharmacy knowledge from professional year 1 to professional year 4
- Knowledge growth in the content areas and differences between the content areas over the years

### What content does the PCOA cover?

The content of the PCOA follows its blueprint, which covers four content areas and 35 subtopics. The table on the next page lists the content areas.



## CONTENT AREAS

### Area 1 - Basic Biomedical Sciences

- A. Anatomy and Physiology
- B. Pathology/Pathophysiology
- C. Microbiology
- D. Immunology
- E. Biochemistry/Biotechnology
- F. Molecular Biology/Genetics
- G. Biostatistics

### Area 2 - Pharmaceutical Sciences

- A. Medicinal Chemistry
- B. Pharmacology
- C. Pharmacognosy and Alternative and Complementary Treatments
- D. Toxicology
- E. Bioanalysis/Clinical Chemistry
- F. Pharmaceutics/Biopharmaceutics
- G. Pharmacokinetics/Clinical Pharmacokinetics
- H. Pharmacogenomics/Genetics
- I. Extemporaneous Compounding/Parenteral/Enteral

### Area 3 - Social/Behavioral/Administrative Pharmacy Sciences

- A. Health care Delivery Systems
- B. Economics/Pharmacoeconomics
- C. Practice Management
- D. Pharmacoepidemiology
- E. Pharmacy Law and Regulatory Affairs
- F. History of Pharmacy
- G. Ethics
- H. Professional Communications
- I. Social and Behavioral Aspects of Practice

### Area 4 - Clinical Sciences

- A. Pharmacy Practice and Pharmacist-Provided Care
- B. Medication Dispensing and Distribution Systems
- C. Pharmacotherapy – Practice Guidelines and Clinical Trials
- D. Pharmacotherapy – Health Promotion/Disease Prevention
- E. Pharmacotherapy – Pharmaceutical Care
- F. Pharmacist-provided care for Special Populations
- G. Drug Information
- H. Medication Safety
- I. Literature Evaluation and Research Design
- J. Patient Assessment Laboratory

## Administration

### When and where will the PCOA be administered?

The PCOA is administered during a predetermined window of time, which is typically during the first quarter of each calendar year. Administration of the assessment during this time each year allows for consistent measurement of the knowledge and skills acquired during most of the program curriculum year, while still allowing enough time for the schools to receive the scores and provide feedback to students before the end of their program year. The assessment is administered on the campus of each participating school of pharmacy, so no additional or unusual travel is required of the students.

### How is registration for the assessment conducted?

Prior to the assessment, NABP will provide to the pharmacy schools the assessment date, registration materials, PCOA testing policies, and proctor requirements. To avoid possible conflicts of interest, assessments may not be proctored by pharmacy program faculty, though other employees of the institution are permitted to proctor, if necessary. Registration is to be completed by the pharmacy program, which includes a listing of the names of all students that will be taking the assessment, along with assessment fees (\$75 per assessment) and assessment site administrator information. At the end of the assessment, the test site administrator will be responsible for securely returning all materials to NABP for scoring.

## Score Reports

### How is the PCOA scored?

NABP uses a Rasch-based item response theory (IRT) model to produce individual scores. Rigorous psychometric analyses are performed to assess model fit, item functioning, accuracy of the key, and form-level reliability. Scores are produced for the total assessment as well as for each of the content areas. Assessment forms from each annual administration are equated to one another. As a result, scores from across administrations are placed on the same measurement continuum, which permits accurate comparisons to be made between the content area scores and between the scores from one year to the next.

### What information is provided in the score reports?

Two types of score reports are provided: one is customized for each individual student and another is prepared as a school-level summary report. Both types of score reports are sent to the pharmacy school. Student reports are provided to pharmacy school faculty so that they may disseminate to individual students. It is recommended that faculty meet with students to provide and discuss individual results and plan for the students' next program year.

Student score reports include students' scale scores and their national percentile for their program year for the total assessment and for the four content areas. Additionally, the percent of items correct on the 35 subtopics is provided.

School score reports include summaries of data for the particular school by program year, including the number of examinees, mean school scale scores, mean school percent correct, and mean school percentile. For information about the national reference group, the mean national scale score and mean national percent correct scores are provided. All these scores are provided for the total assessment as well as for each of the four content areas. Also, the average percent of items correct on the 35 subtopics is included, as is the mean number of items correct for the national reference group. Finally, a score roster listing the schools' students' scores (in a condensed format) is provided.