Prescription for Success

Physician Assistant College Admissions Test (PA-CAT)

Physician Assistant Pre-Matriculation Success Program

Helping PA programs and their students succeed.

Identify the academic preparedness of PA applicants in the key foundational subjects most important for them to know.

For admitted students, use Exam Master's pre-matriculation program to reduce knowledge gaps identified on the PA-CAT admissions exam.

The PA Admissions Challenge: Accurately Selecting the Best-Qualified Candidates

With a need to evaluate hundreds of applicants from a variety of educational experiences and backgrounds, PA programs struggle making objective, informed decisions about which applicants are most likely to succeed in their program.

WHY A PA ADMISSIONS EXAM?

The PA curriculum is demanding. Only academically strong students are likely to graduate and pass the PANCE. PA programs rely on admissions indicators such as prior course work, prior GPA, science GPA, and in some cases GRE scores to help identify the academically stronger candidates. All of these indicators have limitations when comparing applicants from a variety of backgrounds and educational and work experiences.

MEETING THE CHALLENGE

After extensive research and conversations with PA educators, we learned that many PA programs felt they would benefit from use of an admissions exam targeted to the PA profession. To meet this need, Exam Master developed a pilot admissions exam called the Physician Assistant College Admissions Test (PA-CAT). The PA-CAT is designed to measure applicant achievement in prerequisite subjects most commonly required for admission to PA school, including topics that are foundational to succeeding in the critical first year.

Whether PA programs want to improve their diversity, need help diagnosing knowledge gaps in qualified candidates, or need an extra tool to help select the best candidates, the PA-CAT will provide these educators with an objective indicator of applicant academic readiness.

Many PA programs have expressed a need for an objective tool to help them accurately measure and compare the academic preparedness of their applicants.

The PA-CAT is available now for late-stage testing for PA programs looking to strengthen their admissions process, to assess their interview candidates, or simply to have a reliable snapshot of the academic preparedness of their new students.

FIELD-TESTING: PA COMMUNITY INVOLVEMENT IS KEY

Led by Johnna Yealy, PhD, PA-C and Scott Massey, PhD, PA-C, the PA-CAT developmental project has involved more than 850 newly enrolled PA students from over two dozen PA programs. In 2019, extensive field-testing has continued with additional PA programs helping to stress test the PA-CAT. This collaborative effort has ensured the participation of a wide variety of PA programs across the United States.

Cover the most important prerequisite subjects

Prerequisite subjects required for admission vary among PA programs, but a core set of subjects is common to most. Subjects covered on the PA-CAT have been selected because of their relevance to student success during the demanding didactic portion of their education.

Focused learning objectives relevant to PA School

The PA-CAT covers the important prerequisite subjects and the topics and concepts within those subjects considered most relevant to PA school. Over time, adjustments to the PA-CAT from this focused approach will help improve its predictive value.

Four Keys to Building a High-Quality Admissions Exam

Extensive field-testing

Over 25 PA programs have participated in the PA-CAT admissions exam project. Cohorts of new PA students helped to stress test early versions of the PA-CAT—more than 850 examinees! This field-testing helped us identify under-performing test items and develop a scaled scoring model for subsequent versions of the exam.

PA Community involvement

The PA-CAT project has been the vision of Exam Master and the project's two principal investigators: Johnna Yealy, Ph.D., PA-C and Scott Massey, Ph.D., PA-C. The support from our PA advisory committee, researchers, item writers and reviewers, and the many involved PA program directors and faculty has also been invaluable.

This truly community-based project has been supported by the collective thoughts, ideas, and experience of many who serve and work in the PA educational community.

Development of the PA-CAT:
Focus on What Applicants Should Know

The PA-CAT is designed to be a broad-based exam reflecting the common educational experiences of most PA applicants. Topics were chosen based on literature reviews, surveys, and consultations with PA educators who were asked to identify which prerequisite subjects, topics, and concepts are most important for mastery of the demanding PA curriculum. Anatomy and physiology are given the most emphasis in recognition of what PA students must learn early in the curriculum.

Early versions of the PA-CAT were composed of 180 multiple choice items covering 12 subject areas. Extensive field-testing has allowed for deep analysis of item performance, and

The PA-CAT is designed to be a broad-based exam reflecting the common educational experiences of most PA applicants. PA Faculty helped identify those subjects, topics and concepts they believed most important for new PA students to know.

longitudinal tracking of examinee performance will aid in the long-term evolution of the exam. Future versions of the PA-CAT may be longer in length but will still feature single-best-answer multiple choice questions. Future versions of the exam will incorporate best evidence of which concepts are most useful to measure in a PA admissions examination.

TESTING HIGHER COGNITIVE DOMAINS

The PA-CAT was developed to properly differentiate between academically weaker and stronger candidates in a way that does not simply test knowledge recall. Exam items were constructed to assess higher cognitive domains, particularly knowledge application.

PA-CAT Weighting by Cognitive Level

COGNITIVE LEVEL	PERCENTAGE OF TEST
Knowledge	22
Comprehension	19
Application	41
Analysis	16
Evaluation	1
Synthesis	1

PA-CAT Content Structure

PA-CAT test items are developed by subject experts to measure key learning objectives based on common, college-level syllabi for each prerequisite subject. Items are chosen for inclusion in the PA-CAT based on what basic- to intermediate-level learners are expected to know in that subject. Additional item selection criteria focus on those topics and concepts deemed most important to success in the PA curriculum.

Each subject covered on the PA-CAT is organized along a hierarchical domain from general to specific. This multi-level approach allows for very granular scoring feedback, particularly for the most heavily weighted subjects.

Anatomy
The Back
- Curvatures and Associated Pathologies of the Vertebral Column
- The Vertebrae
- Joints of the Vertebral Column
- The Extrinsic Back Muscles
- The Intrinsic Back Muscles
- Spinal Cord and Spinal Nerves

The Upper Limb
- The Pectoral
- The Axilla
- The Shoulder
- The Brachial Plexus
- The Arm
- The Forearm
- The Wrist and Hand

Etc.

Physiology
The Cell
- Functions of the Cellular Organelles
- Central Dogma of Molecular Biology - Translation and Transcription
- Macromolecules of the Cell

Membrane Anatomy and Physiology
- Diffusion and Osmosis
- Membrane Transport
- Basics of Membrane Potential
- The Action Potential
- The Muscular Contraction
- Membrane Structure

Etc.

Note: Due to limitations on exam length not all sub-categories are covered on each version of the exam.

PA-CAT Test Blueprint by Subject Area*

SUBJECT AREA	PERCENTAGE OF TEST	TOPICS COVERED
Anatomy	15	The Abdomen; The Back; The Head; The Lower Limb; The Neck; The Pelvis and Perineum; The Thorax; The Upper Limb
Physiology	15	Blood and Clotting; Circulation; Endocrinology; Gastrointestinal Physiology; Membrane Physiology; Metabolism; Nervous System; Renal Physiology; Reproduction; Respiratory Physiology; The Cell; The Heart; The Special Senses
Microbiology	10	Microbiology; Bacteria; Environmental Microbiology; Fundamentals of Microbiology; Fungi; Interaction between Microbe and Host; Microorganisms and Human Disease; Parasites; Viruses
General Biology	10	Bioenergetics; Biotechnology; Cell Structure and Function; Cellular Reproduction; Cellular Respiration; Cellular Transport; Chemical Building Blocks; Chemical Composition of Cells; DNA; Gene Expression; Genetics; RNA; Signal Transduction; Viruses
Genetics	10	Introduction; Molecular Structure and Replication of Genetic Material; Patterns of Inheritance
General Chemistry	10	Acids and Bases; Atoms, Ions, and Molecules; Basic Concepts; Chemical Bonding and Molecular Geometry; Chemical Reactions; Electrochemistry; Gases; Liquids, Solids, and Solutions; Stoichiometry; Thermochemistry and Energy
Biochemistry	5	Carbohydrates; Enzymes; Fat Soluble Vitamins; Integration of Metabolism; Lipids; Nucleic Acids; Protein; Specialized Metabolism of Tissues; Specific functions of proteins - disorders of metabolism
Organic Chemistry	5	Acids and Bases; Alkanes; Bond Properties; Chemical Bonding and Structure; Cycloalkanes; Hybridization/LCAO; Molecular Orbital Theory; Resonance; Stereochemistry
Psychology	5	Biological Bases of Behavior; History and Approaches; Lifespan Development; Memory; Motivation and Emotion; Psychological Disorders; Sensation and Perception; Social Psychology; States of Consciousness
Sociology	5	Culture; Deviance and Conformity; Research Methods; Social Change; Social Inequalities; Social Institutions; Sociological Perspective
Statistics	5	Anticipating Patterns; Exploring Data; Sampling Experimentation; Statistical Inference
Medical Terminology	5	Cardiovascular; Musculoskeletal; Sense Organs; Skin; Suffixes; Terms Pertaining to Body as a Whole

*Based on research versions of the PA-CAT. Actual exam subject to changes.

Criterion-Referenced and Norm-Referenced Assessments and the PA-CAT

There are two fundamental ways standardized exams report results. A criterion-referenced exam is designed to determine whether an examinee has achieved a minimally acceptable level of performance measured against a set of standards. A norm-referenced exam shows where individual examinee scores rank within a group or sub-group of all examinees. The PANCE and most board/licensure exams are good examples of the criterion-referenced approach. The GRE, on the other hand, provides for percentile rankings within its three domains in addition to scaled scores.

What the PA-CAT will provide is evidence-based data on what applicants have learned in the prerequisite subject areas by the time they apply to PA school.

For 2020, we will not be recommending a specific cut score or offering normed rankings for the PA-CAT examinees. Over time, as more examinee data is collected and evaluated, these performance indicators will be made available. What the PA-CAT will immediately provide participating programs is a tool to help better evaluate and rank the academic preparedness of their applicants or interview candidates.

Tracking student data longitudinally will help determine whether or how the PA-CAT should serve as a true criterion-based examination and will offer reliable normed rankings of examinee scores. Our ongoing objective over time is to continue to research and identify those concepts most useful to assess on a PA admissions exam.

SCALED SCORES

PA-CAT scores will be reported on a scaled basis to minimize measurement errors and to maximize reporting accuracy of results across different versions of the exam. A scaled score can also help better differentiate between academically weaker and stronger examinees based on item difficulty and other factors.

The PA-CAT is designed to be an important supplemental tool to help PA programs better assess the academic preparedness of their applicants. Over time, the exam will offer rich opportunities for developing useful "passing" criteria and national norms across all subjects covered on the exam. Initially, the PA-CAT will help PA programs identify how their applicants rank within their applicant pool, providing a useful, objective data set helping to inform the admissions process.

Exam Master has been supporting health professions education since 1994, serving over 100 PA schools and a variety of health professions programs, colleges, and universities.

Meet Exam Master

For the last 25 years, Exam Master has served the health professions community by offering a variety of resources to support board and licensure exam preparation, student assessments, remediation, and overall program success. Professions served include pharmacy, dentistry, medicine, physician assistant, and nursing. Exam Master also works with many medical libraries to support the success of their constituents. Exam Master currently serves over 400 health science institutions.

Exam Master has developed a deep talent pool of experienced staff and dedicated subject matter experts who enable us to tackle a wide variety of challenges in the education and training of our future health practitioners. We also learn from the wide variety of professions we serve, often applying the solutions and best practices of one discipline to the challenges of another.

Exam Master has been supporting physician assistant education and training for many years. These relationships have helped us to understand and respond to the needs of this important and fast-growing profession. They have also made it possible for the PA-CAT project to enjoy broad community support and participation.

PA-CAT Early Results
Expanded Community Involvement

With over 850 participating incoming students from a diverse group of PA programs, the PA-CAT project has produced a rich set of data on examinee performance.

Critical to our ability to develop a quality, relevant admissions exam is community involvement. From our talented principal investigators, Dr. Johnna Yealy and Dr. Scott Massey, to our advisory committees, to the PA program directors willing to make the effort to get involved, and the new students willing to give up some of their time to sit for the exam, we are grateful to all who have assisted with this project.

Field-testing of early versions of the PA-CAT began in May of 2018 and continues into the present. An updated version of the PA-CAT will be available in January 2020 for PA programs wanting to benefit from an objective assessment as part of their admissions process for 2020 and beyond.

Initial analysis shows a statistical correlation between early PA-CAT admissions exam results and undergraduate science GPA.

PA-CAT Summary

Number of examinees*	897
Number of items	180
Reliability of test scores	0.85

* As of 8/2/2019

Thanks to the participation of a broad segment of PA programs operating under a variety of admission and enrollment cycles, we have been able to accelerate the PA-CAT development cycle. As of August 3rd, close to 900 examinees across a wide variety of PA programs have participated in the project.

With extensive field-testing and analysis, overall reliability of the instrument has continued to improve. Item analysis and item swapping have allowed us to create an instrument that can discriminate between high and low performers. Early results also showed a statistically significant correlation between PA-CAT scores and undergraduate science GPA.

PA EXAMINEE PERFORMANCE

Under PA-CAT field-testing, the goal was to gain a detailed measurement of what PA applicants have retained from prior course work, studies, and work experience without remediation or additional preparation. Further work has been done to evaluate the relative difficulty of the test questions and the relevance of the content being tested. Early results are reported in those subjects receiving the most weighting, which have sufficient numbers of items for meaningful subject-level reporting.

Performance of PA-CAT Examinees

SUBJECT AREA	NUMBER OF ITEMS	MEAN PERCENT OF ITEMS CORRECT
Anatomy	27	53
Physiology	27	60
Microbiology	18	41
General Chemistry	18	48

* As of 7/8/2019

Pre-Matriculation:
Helping New PA Students Succeed

One important use of the PA-CAT will be to help identify those applicants with strong foundational knowledge who rank well on the exam with their peers but may not appear "on paper" to be as academically qualified. Since many PA programs have a goal to recruit and admit from a more diverse applicant pool, this aspect of the exam may be particularly helpful to those efforts.

For PA programs concerned about admitting applicants who have the basic skill set needed to be a successful in PA school but who are somewhat weaker academically, use of the PA-CAT partnered with Exam Master's Physician Assistant Pre-Matriculation Success program can be a big help.

Health professions education—including PA education—is not designed to remediate more than a handful of incoming students per cohort.

Refreshing students on prerequisite knowledge gaps is more efficient and effective than waiting until needed remediation is identified after classes begin.

A pre-matriculation program has three essential components, designed to provide new students with a tune-up or refresher in the core prerequisite subjects they need to know:

- Initial Baseline Assessment
- Targeted Course Modules
- Summative Course Exams to Measure Learning

PA programs receive detailed PA-CAT feedback on how each applicant performed by subject. When a PA program wishes to admit qualified students in need of some preparatory or remedial academic work, the detailed PA-CAT outcome data can be used to identify learning gaps that might put these new students at risk of falling behind. Use of Exam Master's self-paced pre-matriculation program can then help support these new students.

On the next page is an example of the program structure for Exam Master's online, self-paced, Pharmacy Pre-Matriculation Success program used by hundreds of pharmacy students before they start their first professional year. A similar program is under development for PA schools.

Sample Pre-Matriculation Curriculum*:
Three Steps to Success!

Step 1: Baseline Assessment

SUBJECT	NUMBER OF QUESTIONS	PERCENTAGE
Math	18	15%
General Chemistry	18	15%
General Biology	18	15%
Organic Chemistry	10	8%
Biochemistry	10	8%
Physiology	28	23%
Microbiology	18	15%
TOTAL	120	100%

Step 2: Learning Modules and Check Questions

SUBJECT	NUMBER OF LEARNING OBJECTIVES COVERED*	NUMBER OF LEARNING CHECK QUESTIONS
Time Management	N/A	N/A
Math	40	130
General Chemistry	10	41
General Biology	8	22
Organic Chemistry	10	23
Biochemistry	28	56
Physiology	26	27
Microbiology	36	80
Critical Thinking	N/A	N/A
TOTAL	158	379

Step 3: Summative Course Exams

SUBJECT	NUMBER OF QUESTIONS	STEP 2 & 3 COURSE TIME*
Time Management	N/A	1.00
Math	80	7.25
General Chemistry	30	2.25
General Biology	30	1.50
Organic Chemistry	25	1.75
Biochemistry	56	7.50
Physiology	53	3.25
Microbiology	80	7.25
Critical Thinking	N/A	1.00
TOTAL	354	32.75

*Actual program content for Exam Master's Pharmacy Pre-Matriculation Success program

Support Your Admissions Process with the PA-CAT

For 2020, PA programs will have two options for use of the PA-CAT: assessment of their interview candidates or assessment of all applicants. Exam Master will also offer individualized scoring reports for each examinee — reports that go beyond what is typically available from a national standardized exam. These individualized reports will provide PA programs with useful data on the academic preparedness of their overall applicant pool and of those students who are admitted.

With Phase II of the data collection and analysis completed during 2019, the first commercial version of the PA-CAT will be available to PA Programs starting in January of 2020.

It is important that PA programs wanting to take advantage of the PA-CAT program in 2020 notify prospective applicants of its intended use before the start of their next admissions cycle. Further details will be made available on how and where applicants can access the PA-CAT, fees, and other requirements.

The PA-CAT is more than a standardized exam. It is a tool that will provide PA educators detailed information on applicants and can help participating PA Programs more reliably meet their objective of admitting the best possible applicants for their unique program.

Now is the time to get started for 2020 PA-CAT planning for your program. Let's have a call.

Matt Bader
President and CEO
mbader@exammaster.com

Jim Pearson
VP of Academic Solutions
jpearson@exammaster.com

Judy Cox
VP of Project Management
jcox@exammaster.com

Early PA-CAT Scholarship/Publications

Early data has provided opportunities for some early scholarship and publication:

For information regarding PA educator attitudes about a PA admissions exam and current PA admission practices, see the Research Brief presentation at the 2019 PAEA Education Forum:

Current PA Admissions Practices: The Common and Uncommon.
Authors: Denault D, Allman M, Yealy J.

For information regarding the initial PA-CAT analysis at a program level, see the poster presentation at the 2019 PAEA Education Forum in Washington, DC:

Correlation of Admission Variables and a Standardized PA Admission Exam
Authors: Beck D, Patterson PD, Murphy E, Allias M, Hare J, Hammond J, Fannie R, Rodgers C.

Or read early peer reviewed research in the Internet Journal of Allied Health Sciences and Practice:

The Relationship Between the PA School Admissions Exam (PA-CAT) versus Prerequisite GPA
Authors: Massey S, Rajat C, Beck D, Yealy J.

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students succeed with our

**Physician Assistant College
Admissions Test (PA-CAT)**
and
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Success Program**

**Contact Matt Bader at
mbader@exammaster.com
800-572-3627 x 101**

exammaster.org/pa-admissions/