



Predictors of scores on the North American Pharmacists Licensure Examination (NAPLEX) differ by competency area

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Background

Schools of pharmacy endeavor to find the perfect combination of admission variables to select applicants who are most likely to succeed in pharmacy school and on the NAPLEX. Several recent studies identified various predictors of success on the NAPLEX, including composite PCAT scores, no unsatisfactory grades in the pre-pharmacy program plus a high cumulative GPA in the PharmD program, a prior degree plus high first-year pharmacy school GPA, and not needing remediation for deficient course grades during pharmacy school. This suggests that predictors of success could be school-specific, meaning that schools may attract different pools of applicants based on current student demographics, the school's and/or student's geographic location, school rankings, research opportunities, and more.

Objective

The objective of this project was to explore the patterns and drivers for better scores on the **NAPLEX's three competency areas** - pharmacotherapy, preparation and dispensing of medications, and public health information.

Methods

We collected data on 362 PharmD students who graduated from University of Maryland School of Pharmacy between 2011 and 2013. This study was reviewed and approved by the University of Maryland's Institutional Review Board. Pharmacy school admission data included gender, ethnicity, date of birth, state of residence at application, pre-pharmacy academic performance (overall grade point average (GPA), science GPA, math GPA), composite and subtest scores on the Pharmacy College Admission Test (PCAT), internal admission process subscores, early decision, undergraduate institution characteristics, such as geographic location, school concentration, ownership, size, and nationwide ranking; and type of undergraduate degree earned if any. We also collected pharmacy school performance data including PharmD final GPA and scores on the NAPLEX (overall scaled score and score in each competency area). We used multivariate ordinary least squares regressions to evaluate the factors considered to be associated with higher NAPLEX score.

Results

Table1 . Multivariate ordinary least squares analyses modelling predictors of NAPLEX competency areas scores.

	1. Pharmacotherapy (56% of Test) N=361, R-sq=0.36	2. Preparation and Dispensing of Medications (33% of Test) N=361, R-sq=0.18	3. Provide Health Care Information (11 % of Test) N=361, R-sq=0.14
	Effect	Effect	Effect
Age			
18<=Age<22 yrs	Reference	Reference	Reference
22<=Age<25 yrs	0.0	0.0	0.27
Age>25 yrs	-0.2**	-0.2	-0.03
Shady Grove (vs. Baltimore) Graduating Class			
2011	Reference	Reference	Reference
2012	-0.40*	0.0	-0.12
2013	-0.2	0.2	-0.16
Male (vs. Female)	0.1	0.2	-0.23
Geographic location			
MD	Reference	Reference	Reference
Northeast	0.1	0.0	0.15
Midwest	-0.1	0.0	-0.28
West	-0.53*	-0.2	-0.34
South	0.3	0.1	0.22
Degree			
Bachelor Science	Reference	Reference	Reference
Associate	-0.1	0.2	0.27
No degree	0.40*	0.1	-0.25
Bachelor Arts	0.1	0.1	-0.40**
Graduate	-0.3	-0.48**	-0.27
PCAT Biology %	0.00	0.00	0.01*
PCAT Chemistry %	0.01*	0.01***	0.00
PCAT Quantitative Ability %	0.00	0.01*	0.01**
PCAT Reading Comprehension %	0.00	0.01*	0.005
PCAT Verbal Ability %	0.006*	0.0	0.01*
Undergrad Cumulative GPA	-0.03	-0.21	-0.05
Final GPA	1.89*	1.47*	1.28*

* Significant at level of confidence $p < 0.05$ ** Significant at level of confidence $p < 0.10$
*** Significant at level of confidence $p < 0.15$

The selection of predictors for best fit models excluded undergraduate institution characteristics, early decision, legacy, race, academic grade in pharmacy law, and PCAT essay score.

The selection of predictors with final GPA resulted in better fit and explained greater variation of the NAPLEX scaled areas R-sq=0.36 (Area 1), 0.18 (Area 2), and 0.14 (Area 3).

- Higher scaled scores in **NAPLEX Area 1** (pharmacotherapy) were explained by higher PCAT chemistry and verbal ability subtest scores
- Higher scaled scores in **NAPLEX Area 2** (preparation and dispensing of medications) were explained by higher PCAT quantitative ability and reading comprehension subtest scores
- Higher scaled scores in **NAPLEX Area 3** (public health information) were explained by higher PCAT biology, quantitative ability, and verbal ability subtest scores
- Final PharmD GPA, but not undergraduate GPA, was associated with higher scores in all three competency areas of the NAPLEX
- Performance on **all three areas of the NAPLEX** had the highest association with verbal ability and final GPA (p -value<0.05).

Implications

Programs may consider these results in a holistic approach to curricula. For admissions criteria, emphasis should be placed on PCAT verbal scores which is not currently a practice discussed with schools that share their scoring system. Chemistry, math, and biology PCAT scores continue to be a predictor for student competencies. Undergraduate GPA has been shown to be a predictor for performance in pharmacy school, but does not correlate with better NAPLEX performance. Better performance was more likely seen with students admitted through our early decision process. Since they applied via early decision they may be more confident in their selection of pharmacy as a career path and thus more dedicated to working toward success on licensing exams.

For the future: does a higher NAPLEX score predict a better pharmacist in practice?

