

# Am I Going to Fail the PANCE? Estimating Risk

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## Purpose

What message do we give students who consistently pass their exams but by only a slim margin? In this familiar case, students may falsely assume sufficient readiness to pass the Physician Assistant National Certification Exam (PANCE). Unfortunately, while some student scores predict PANCE performance,<sup>1-3</sup> student risk status during training is poorly conveyed. We describe a metric for estimating the probability of failure at any time during training, making use of all or a sub-set of available student data. In this poster we illustrate the use of "Risk Estimates" to convey likelihood of failing the PANCE.

## Methods

We describe the application of risk estimates for communicating likelihood of success on the PANCE to a graduating class of students (2014). These estimates can be calculated at any time during training, becoming increasingly powerful as they are based on greater amounts of student data. Risk estimates were calculated and validated using regression coefficients built from 3 previous graduate cohorts (2011-2013).

## Results

Table 1 shows the increasing predictive power of regression coefficients, built from increasingly larger data sets, from the available 2011-2013 cohorts to predict 2014 PANCE success.

Table 2 shows the results of a stepwise regression to select only the most significant predictors. This set of "index predictors" was used to calculate at-risk values for each student.

**Table 1: 2014 Regressions Across Training Timeline**

Grades and PACKRAT Scores (Entry Steps)	R	Adjusted R-sq	F-sq Change	Total Vars	Sg. Change
1 Fall	0.64	0.40	0.41	5	0.00
2 + Winter	0.69	0.44	0.07	13	0.01
3 + Spring + PACKRAT 1	0.77	0.54	0.11	21	0.00
4 + PACKRAT 2	0.84	0.66	0.11	22	0.00

**Table 2: 2014 Predictor Model Stepwise Selection of Variables**

Predictors	Beta	Standardized Beta	Sg.
(Constant)	-821.37		0.00
Packrat 2	4.21	0.61	0.00
Adult Medicine Final (Spr)	3.41	0.15	0.00
Pathology Test 3	2.18	0.12	0.02
BCSMidterm (Fall)	2.25	0.11	0.03

## Results Cont.

Analysis of this data from Table 1 revealed that a hypothetical student with all scores at passing (80.0%) had a 72% predicted probability of failing the PANCE.

A hypothetical student with all scores at 90% had only a 4% probability of failing the PANCE.

The program chose to consider all students with a 20% or greater chance of failing the PANCE as the definition of at risk.

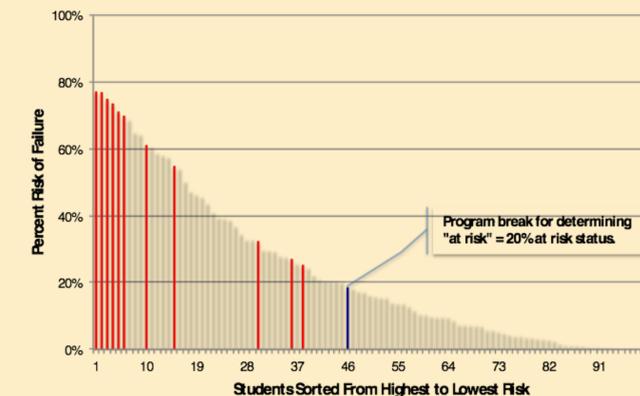
Analysis using chief risk indicators in Table 2 revealed that for the 2014 graduating class 44% of students had an unacceptable risk status—greater than 20% probability of failing the PANCE.

Cross Site Comparison: Risk status of subgroups can be represented by the sum of the student risk probabilities. We used these comparisons to demonstrate risk equivalency across multiple satellite training sites (p=ns). Data not shown.

Figure 1 shows the risk factor estimate for each student, sorted from highest to lowest risk, and color codes indicating actual first-time success (blue) or failure (red) on the PANCE.

Student and faculty concerns raised about using risk level predictors are presented in Table 3.

**Figure 1: 2014 Class -- Calculated Percentage Risk of Failure and Actual Pass (blue) or Failure (red) of the PANCE**



**Table 3: Faculty and Student Voiced Concerns**

**Concern:** Providing risk values, especially those for students at high risk, serves as a criticism or indictment of their achievement.

**Response:** Stating that a student is at risk for failure is difficult. However, it is an ethical responsibility of a training program to provide honest feedback to its students and seek means to remediate and help ensure success. Furthermore the program has invested in a well-organized and monitored remediation program for students at risk.

**Concern:** Risk estimates are more difficult to understand than are grades and percentages.

**Response:** Risk estimates are a part of the training necessary to be a practicing clinician.

**Concern:** Risk estimates whether numeric or categorized (e.g., describing someone as "High Risk" or "Low Risk") are not as effective as reporting PACKRAT scores and or course grades.

**Response:** Risk estimates constitute a statistical estimation reflecting the best set of predictors available at any given time. Our experience is that students understand risk estimates in a more intuitive manner and are more likely to participate in remediation than if recommendations come strictly from exam or PACKRAT scores.

## Discussion

Risk scores provide a familiar and easily understood status indicator. Our program is concerned when risk exceeds 20%. Remediation efforts are undertaken with these students. Risk scores also provides a means to compare performance across PA programs, satellite sites and conduct research on the probability of success of different subgroups, or between successive cohorts.

## Key Findings and Lessons Learned

- Some students and faculty report difficulty interpreting risk estimates.
- Risk estimates provide a statistically sound means for making critical program comparisons, such as equivalency of student performance across satellite sites.
- Our program sets a course minimum (80%) in all courses. This is insufficient for predicting success on the PANCE, resulting in an ongoing discussion of assessment and curriculum across both didactic and clinical years.
- Risk estimates are highly flexible. They can be calculated from matriculate data (e.g., GPA) or at any point in time, using increasingly more data points, of a student's training.
- We use risk estimates as a way to monitor our curriculum and students within a cohort to intervene early, and as a means for comparison across years for program evaluation.
- Risk status estimates predict higher rates of failure than actually experienced by our program. We believe this difference reflects significant investment in curriculum changes for all students and targeted remediation efforts with students who found to be at high risk of failure.

## References

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