

## ABSTRACT: 2017 ELAM Institutional Action Project Symposium

**Project Title:** Development of a Longitudinal Medical Student Advising Model to Prevent Step 1 Failure

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**Background, Challenge or Opportunity:** Residency match is becoming increasingly competitive as the number of US graduating medical students has grown to exceed the number of US residency spots<sup>1</sup>. Step 1 scores remain the most important indicator used by program directors in evaluating applicants for residency.<sup>ii</sup> As the University of Louisville School of Medicine curriculum transitioned away from discipline-based courses, faculty and staff expressed the need for a more formal advising structure to monitor student outcomes and effectively predict which students need intensive intervention prior to taking Step 1.

**Purpose/Objectives:** To develop an internal, systematic, proactive, data-driven advising system and personnel to individually assesses each student and develop a plan for their success on Step 1.

**Methods/Approach:** A Step 1 task force was convened that included staff and faculty from the curriculum, financial aid, and student affairs offices as well as students. A multifaceted plan was designed that included 1) development of a standing Student Progress Committee, 2) development of a longitudinal database and statistical risk assessment model, 3) new school policies that require students reach a threshold score on NBME selfassessments prior to taking Step 1, and 4) a new Educational Specialist position to provide data-based advising to all students as well as intensive, individualized counseling and follow-up to the highest risk students.

**Outcomes and Evaluation Strategy:** A position description for the Educational Specialist has been written and interviews are complete. The Student Progress Committee's membership has been delineated and its chair identified. Using the Class of 2018 cohort's Step 1 results, 25 variables that indicate student success or distress were statistically analyzed, and a multivariate model was created. The model effectively predicted Step 1 Score and predicted pass vs failure results with a sensitivity of 82%, specificity of 99%, positive predictive value of 99%, and negative predictive value of 100%. This statistical model and process will be piloted with the Class of 2019 in the Spring 2017. Further adjustment of the statistical model and the required threshold score on NBME selfassessment are anticipated using the pilot data from the Class of 2019. Evaluation of effectiveness of the multifaceted intervention will be measured by comparing Step 1 percent passing and mean Step 1 score to historical norms. For high-risk students, the cost of remediation will be evaluated, including length of additional time needed for Step 1 remediation for high-risk students and additional cost incurred to student for review programs or additional tuition charges. Over time, trends in these outcomes will assist in evaluating the effectiveness of the program.

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<sup>1</sup> National Resident Matching Program, Data Release and Research Committee. Charting Outcomes in the Match for U.S. Allopathic Seniors. Washington, DC: National Resident Matching Program; 2016. <http://www.nrmp.org/match-data/main-residency-match-data/> Accessed April 8, 2017 <sup>ii</sup> National Resident Matching Program, Data Release and Research Committee. Results of the 2016 NRMP Program Director Survey. Washington, DC: National Resident Matching Program; 2016. <http://www.nrmp.org/match-data/main-residency-match-data/> Accessed April 8, 2017

# Development of a Longitudinal Medical Student Advising Model to Prevent Step 1 Failure

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## Introduction

- The University of Louisville School of Medicine (ULSOM) has a stated goal of 100% residency match.
- In 2017, 6% of U.S. seniors failed to match into a residency.<sup>1</sup>
- Step 1 scores remain the most important indicator used by program directors in evaluating applicants for residency and interviews.<sup>2</sup>
- As ULSOM curriculum evolved, new data points emerged that required study to assess their relationship to Step 1 performance.
- Students benefit from expert advising to assess their probable Step 1 performance and to make informed decisions.
- To improve Step 1 performance and achieve a 100% residency match, a new approach was needed to better risk stratify and advise students.

## Objective

The purpose of this project is to develop a ULSOM longitudinal, data-driven advising system that assesses each student and supports a 100% Step 1 passage for all first time test takers.

## Methods

A Step 1 task force was convened to improve student advising and preparedness for Step 1 and developed four major strategies:

- Created a *Student Progress Committee* to better track students longitudinally.
- Studied available data outcomes to create statistical risk assessment model and interactive database.
- Required a minimum score on NBME self-assessment prior to taking Step 1.
- Developed a new *Educational Specialist* position to provide improved advising to all students and intensive, individualized counseling/follow-up to the highest risk students.

## Results

### Student Data Dashboard (Beta) Log Out

This page selects students by Class Of Year and compares their STEP 1 scores to the empirically developed Predictor Score.

After loading a list a list of students below you can click a heading to sort the list. When you click a specific student the graph will show as a larger green triangle and their rank in the currently selected group will display in the Student Details below.

#### Student Details

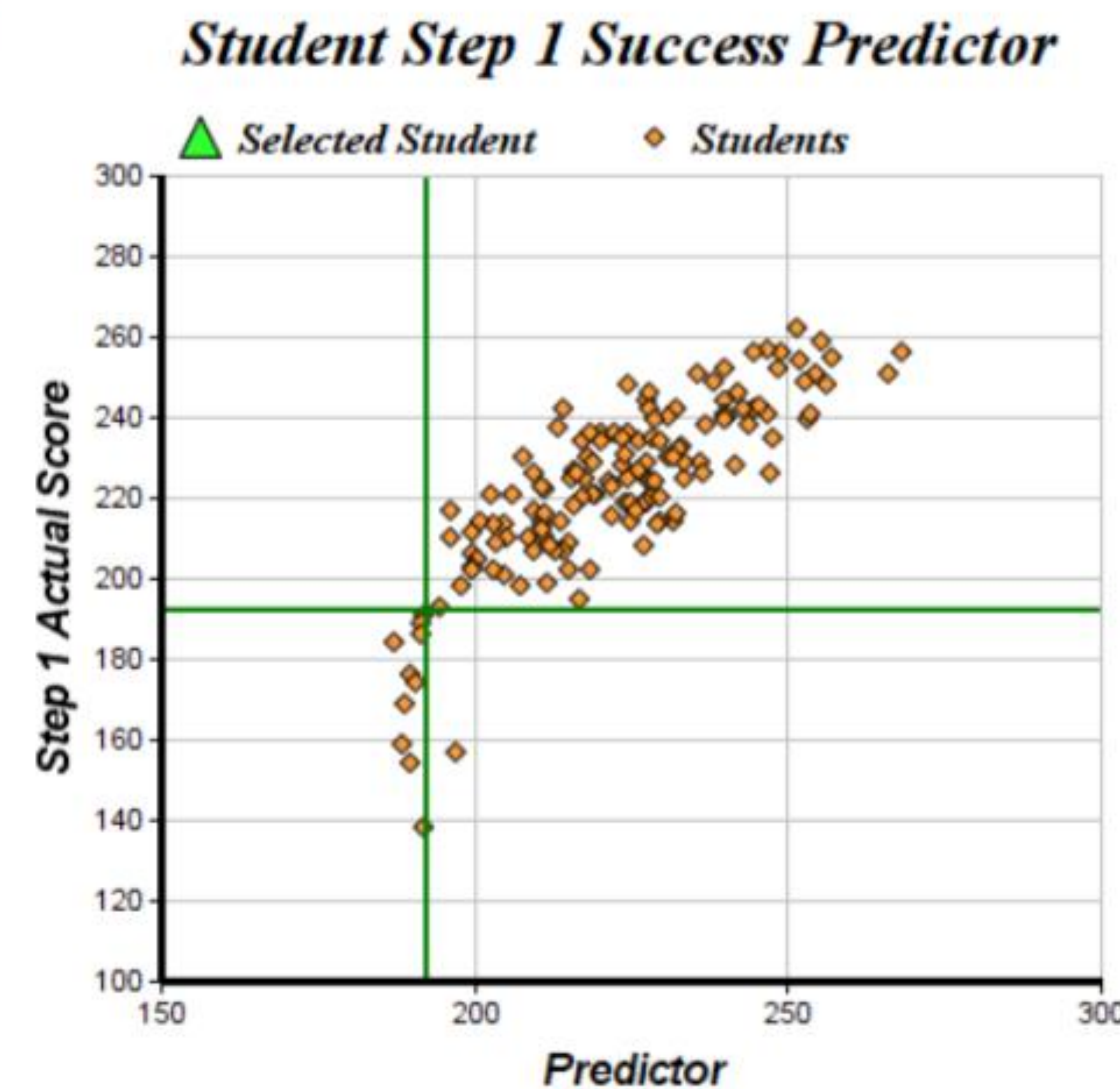
Predictor Score      Predictor Rank  
STEP 1 Score      STEP 1 Rank

Select Class Of Year. Click Column Headings to sort.

Class Of Year: 2018 Load Data  Include ZERO Predictor

▶ Only Class Of Years 2018 & 2019 is loaded ◀

Name ▲	Class Of	Predictor	Step1Score	MCAT	HSA Fall M2	SHELF Fall M2	Drop2Q Hs:Hf M1	Drop2Q Hf:Sf M2	???
	2018	215.92	226	9.00	80.05	67.00			
	2018	211.10	222	30.00	78.00	53.00			
	2018	207.29	198	11.00	78.77	59.00			
	2018	253.25	239	9.33	95.11	78.00			
	2018	233.03	233	9.66	88.02	62.00		Yes	



Screenshot of interactive database interface demonstrates predicted vs. actual Step 1 numeric scores as well as graphic relationship between predicted vs. actual Step 1 score.

		USMLE Outcome		
Model Prediction	Failure	Pass		
	Failure	9	0	PPV 100%
Pass	2	133	NPV 99%	
		Sens 82%	Spec 100%	

### Most Predictive Student Outcomes

- Fall M2 high stakes average (HSA)
- Fall M2 NBME shelf % score
- Drop in 2 quintiles during M1
- NBME % score 2 quintiles < HSA
- MCAT average

## Outcomes

- 25 variables from the Class of 2018 were statistically analyzed and a multivariate model was created to indicate student success or distress.
- The model effectively predicted Step 1 Score and predicted pass vs. failure results with a sensitivity of 82%, specificity of 99%, positive predictive value of 99%, and negative predictive value of 100%.
- The *Educational Specialist* position has been hired and will advise Class of 2019 on Step 1 success using the model.
- The *Student Progress Committee's* membership and charter has been delineated and its chair identified. It will meet to review Class of 2019 prior to Step 1.
- High risk students have been offered additional advising, coaching, and elective time to prepare for Step 1.

## Future Study

- This model will be validated with the Class of 2019's Step 1 results in Fall 2017.
- Further adjustment of the model and the required threshold score on NBME self-assessment are anticipated.
- Evaluation of effectiveness will include the following measures of success:
  - Comparison of Step 1 percent passing and mean Step 1 score to historical norms.
  - Evaluating the cost of remediation for high-risk students, including length of additional time needed for remediation and additional cost incurred for review programs or tuition charges.
  - Comparing match rate for the Class of 2019 and later cohorts to historical norms.

## Bibliography

- National Resident Matching Program, Data Release and Research Committee. Results of the 2016 NRMP Match <http://www.nrmp.org/match-data/main-residency-match-data/>
- National Resident Matching Program, Data Release and Research Committee. Results of the 2016 NRMP Program Director Survey. Washington, DC: National Resident Matching Program; 2016. <http://www.nrmp.org/match-data/main-residency-match-data/>