Using fmCases Examination as a Pretest in a Family Medicine Clerkship

Dana Nguyen, MD, FAAFP [1], Jessica Servey, MD, FAAFP[1], and LaTraia Scott[2]
[1] Department of Family Medicine, Uniformed Services University, Bethesda, MD
[2] School of Medicine, Student Class of 2017, Uniformed Services University, Bethesda, MD

Background and Objectives

Pretests have been shown to contribute to improved performance on standardized tests by serving to facilitate development of individualized study plans.

fmCases is an existing validated examination used widely in Family Medicine clerkships throughout the country.

Our study aimed to:

1) determine if implementation of the fmCases examination as a pretest improved overall failure rates on the end-of-clerkship NBME subject examination

2) to assess if the fmCases pretest scores could be used to predict NBME performance

General education evidence supports improved student performance via use of tests as a teaching tool.

- Retrieval of information during testing aids later retention
- Testing identifies gaps in knowledge
- Testing causes students to learn more from the next study episode
- Testing produces better organization of knowledge
- Testing improves transfer of knowledge to new contexts
- Testing can facilitate retrieval of material that was not tested
- Testing improves metacognitive monitoring
- Testing prevents interference from prior material when learning new material
- Testing provides feedback to instructors
- Frequent testing encourages students to study

Roediger III HL, Putnam AL, and Smith MA. The benefits of testing and their applications to educational practice. *Psych of Learning & Motiv*. 2011(55): 1–36.

Methods

Retrospective cohort study

Control Group: 171 Class of 2016 students

Intervention Group: 160 Class of 2017 students
Intervention: Completion of fmCases exam as a "Pretest" on Day #1 of the FM Clerkship; students provided test results on Day #3, didactic session on how to create an individualized learning plan

Secondary Intervention: Identify learners "at-risk" to fail the end-of-clerkship NBME exam (lowest quintile of student pretest scores); "At-risk" learners have individual counseling session with faculty and/or student mentor

Outcomes: NBME pass rate, NBME score

Statistical Analysis: Chi-square, Paired t-test, Pearson correlation

Results

Table 2. Failure Rates Between Cohorts

	Total	Fail	Failure %
Pretest group	160	13	8.10%
Non-pretest group	171	30	17.50%
Total	331	43	

p = .01

Overall student end of clerkship subject NBME failure rates significantly decreased following the pretest intervention at our institution (18% to 8%, p<0.01).

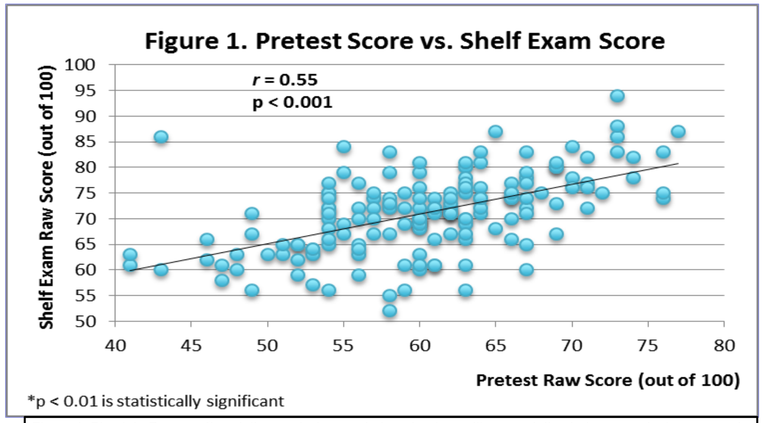
There was a moderate positive correlation between fmCases pretest scores and end-of-clerkship NBME examination scores (r=0.55, p<0.001).

Table 3. Pretest to NBME Score Change

Students	N	Mean
Non-at-risk	132	+ 9.9 (SD 6.7)
At-risk	28	+15.0 (SD 7.5)

t = -3.6, p < 0.001

In addition to the pretest alone, we intervened with "at-risk" learners. The results show that the average score change from pretest score to NBME examination score was 5.1 points greater in the at-risk group than in the non-at risk group.



*p < 0.01 is statistically significant

Figure 1: Bivariate Pearson Correlation analysis revealed moderate positive correlation between pretest scores and NBME examination scores

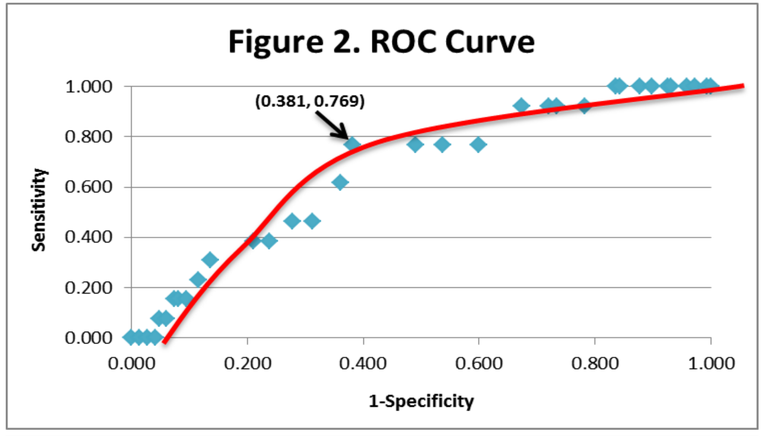


Figure 2: Cut-off point of highest sensitivity and specificity corresponds to a pretest score of 60%. Sensitivity is defined as percentage of students identified as at-risk by the pretest that failed the NBME examination. 1-Specificity is defined as percentage of students identified as at-risk by the pretest that passed the NBME examination

Discussion

Pretest use in undergraduate medical education can be a useful strategy to prepare learners with a study agenda and further enhance their likelihood of success on an end of clerkship exam.

We theorize that completion of the pretest at the beginning of the rotation served as a cognizant or mindful introduction to the clerkship course objectives.

This curriculum change required students to be honest in self-reflection for personal academic aptitude at the beginning of the rotation, and to appropriately guide a personal study plan.

This pretest with case-based "proficiency" report supports the LCME objectives of self-directed learning.

The correlation between pretest score and NBME score helped us identify students most likely to fail the end-of-clerkship exam.

Our subsequent coaching intervention with at-risk learners also appeared to have further academic benefit. There is room to formalize/ standardize the intervention in the future.

Other institutions adopting fmCases as a pretest could use our baseline ROC data to determine their own threshold score based on our sensitivity or specificity assessments.

fmCASES FAMILY MEDICINE COURSE

Disclaimer
The views expressed in this presentation are those of the authors and do not reflect the official policy of the Department of the Army/ Navy/ Air Force, Department of Defense, or the U.S. Government.

Acknowledgements The authors thank Cara Olsen, PhD, USU Biostatistician, for assistance with the statistical analysis on this project.

UNIFORMED SERVICES UNIVERSITY *of the Health Sciences*