Title: Transition to Resident Teacher

Submission Type: Innovation Highlights in Medical Education

Submitting Author: Joseph Fantone, M.D.

Submitting Author Institution: University of Florida College of Medicine

Purpose: A critical component of undergraduate medical education is the involvement of residents as teachers, mentors and role models for medical students. In many circumstances resident assessments contribute to a student’s grade. While formal accreditation requirements of the Liaison Committee on Medical Education (element 9.1) state that “residents....are prepared for their roles in teaching and assessment”, the quality of the resident preparation for their teaching responsibilities in undergraduate and graduate medical programs is highly variable. To address the need for preparing future residents for their teaching roles the University of Florida College of Medicine developed an asynchronous distance education course; Becoming an Effective Resident Teacher (BERT).

Approach/Methods: BERT is a 2-credit longitudinal on-line elective course designed to prepare medical students for teaching responsibilities as interns and residents. It consists of 9 modules with readings, online tutorials and associated assignments. Topics include adult learning theory, writing learning outcomes, principles of assessment, bedside teaching, providing feedback and approaches to the struggling learner. Students complete and submit assignments through CANVAS (our course management system) and receive individual feedback from faculty. The course is designed to be flexible and self-paced to accommodate students’ senior year schedules including residency interviews. The course is graded satisfactory/unsatisfactory.

Results/Outcomes: During the past three years student enrollment averaged 38% of the senior class. The majority of students completed the nine assignments over a 2 month period most frequently during November through March. Student evaluations rate the course highly with annual mean scores between 4.3 and 4.7 (5 point Likert scale: 5=excellent). Student comments indicate great appreciation for course flexibility, its value as preparation for their future teaching roles, timely feedback and the high quality of its resources. Students noted: “This course positively impacted my understanding of the importance and relevance of teaching skills in the medical profession” and “I liked how the module assignments encouraged us to reflect on our own experiences.” Some students suggested more multi-media video examples of good and poor teaching and more timely and consistent feedback on assignments.

Discussion: This course successfully addresses an unmet need of preparing UF medical school graduates to enter teaching roles as future interns and residents. Enhanced teaching skills of students and residents could potentially translate to enhanced communication with and education of patients and health care provider colleagues. There remain opportunities to further develop the course and its learning resources to expand the teaching expertise of our medical graduates. The on-line asynchronous nature of the course allows faculty the flexibility to engage students and provide feedback in a relatively timely manner while allowing students the flexibility for scheduling residency interviews.
**Significance:** This course successfully addresses an unmet need of preparing UF medical school graduates to enter teaching roles as future interns and residents. Enhanced teaching skills of students and residents could potentially translate to enhanced communication with and education of patients and health care provider colleagues. There remain opportunities to further develop the course and its learning resources to expand the teaching expertise of our medical graduates. The on-line asynchronous nature of the course allows faculty the flexibility to engage students and provide feedback in a relatively timely manner while allowing students the flexibility for scheduling residency interviews.

**References:** 1. Functions and Structure of a Medical School. Liaison Committee on Medical Education. 2017, American Association of Medical Colleges and the American Medical Association.
Purpose: Undergraduate medical education (UME) programs are charged with preparing medical students to enter residency. UME programs should remain attuned to the needs of graduate medical education (GME) programs. In 2014, AAMC provided specific guidance on what skills were integral for all entering residents.1 This type of formal guidance provides critical insight for aligning UME programs with GME needs; however, insights from entering residents themselves may be equally informative.

Approach/Methods: As part of our program evaluation processes, we administered a survey to recent medical school graduates after their first year of residency. One open-ended item asked them to “describe the top two attributes of a well-prepared resident at the end of year 1.” We examined 875 text responses collected from 2004 to 2013. Two authors (JP, MZ) reviewed responses independently. Each author developed a list of descriptive-phrase codes that represented the range of themes across responses. Both lists were then compared and consolidated to generate a final list for coding the data. Five coders then used the consolidated list to identify the most prevalent themes. Each response was coded twice, independently, by two coders blinded to the other’s work. The initial agreement rate was 79.2%. All discrepant codes were then reviewed and reconciled. Coded results were tallied to identify the most frequent themes.

Results/Outcomes: We identified 10 major themes. Efficiency (17.5% of responses) was the most common. Sound Clinical Judgment (13.4%) and Knowledgeable (10.2%) occurred with the second greatest frequency. The next tier of attributes occurred with frequencies less than 10%: Self-Awareness of Limitations (6.2%) or the willingness to seek guidance when needed; Hard-Working / Dedicated (6.1%); and Self-Directed / Lifelong Learner (5.0%). Four other attributes all occurred with frequencies less than 5%: Able to Integrate / Apply Knowledge (3.7%), Communication Proficiency (3.5%), Teamwork (3.3%), and Patient Management Proficiency (3.3%).

Discussion: Among our most important findings was that efficiency was the theme most frequently identified as a top attribute of a well-prepared resident. While other frequently-occurring attributes are ubiquitous and covered with increasing scope and frequency in medical education, we know of no robust UME curricula for fostering efficiency.

Significance: As UME and GME seek to foster transitional alignment through shared goals and objectives such as Entrustable Professional Activities and competency milestones, our findings point to a gap in teaching and assessing efficiency at our medical school. This gap impacts the preparation of our graduates for residency, and may be generalizable to other institutions. Expectations for new residents are multi-faceted and require the ability to prioritize, synthesize and perform in fast-paced environments with new levels of responsibility. Further study is therefore needed to identify and
address this gap. Additional study should provide intentional guidance on teaching and assessing efficiency as part of a medical student’s transition to residency.
Title: Bending the learning curve in the core clerkships: Impact of a transition curriculum on student performance

Submission Type: Research Highlights in Medical Education

Submitting Author: Michael Ryan, MD, MEHP

Submitting Author Institution: Virginia Commonwealth University

Purpose: The transition from pre-clinical training to clinical clerkships is often difficult due to an abrupt shift in lifestyle, educational expectations, and responsibilities (1) (2). As a result, student performance is often weakest in their earliest clerkships (3). Methods for mitigating this discrepancy include “curving” clerkship grades (3) (4). While some institutions have developed transition to clerkship courses to assist in learner adjustment (5), the impact of such courses on student performance has not been reported. We developed a multi-modal transition to clerkship curriculum (TTCC) and measured its impact on student performance in their clerkships.

Approach/Methods: Beginning in 2014, a TTCC was implemented between the pre-clinical and clinical phases of our curriculum. The goal of this curriculum was to introduce students to how hospital processes work throughout a patient’s hospitalization and the roles of the physicians-in-training and other members of the healthcare team in each of these steps. The TTCC involved two foundational case-based workshops and a simulation. In the simulation, students worked in teams of four to five students, participating in a standardized patient (SP) experience through a time condensed four phase virtual hospital course (from presentation of illness to hospital discharge.) We assessed the impact of this curriculum by comparing clerkship performance standard scores (T-scores with Mean = 50, SD = 10) for two consecutive intervention cohorts to a historical control group from the preceding two academic years. We also surveyed students who completed the TTTC to gauge their reaction to the curriculum.

Results/Outcomes: A total of 399 students completed the TTCC in 2 years. Simulation required a total of 100 hours of faculty time and 110 SP hours. Paired t-test showed mean clinical clerkship clinical evaluation standard scores for students who participated in the transition to clerkship curriculum (N=399) (Mean=52.38, SD=2.65) were significantly higher than the historical control group (N=329) (Mean=50.93, SD=3.97, p<.01). The largest differences in performance scores were found for the first 3 clerkships. Ninety-eight percent of students responding to the evaluation survey agreed the simulation helped them understand aspects of patient care and improved their ability to work on a healthcare team. All students (100%) reported the activity would help them succeed in their third year.

Discussion: The creation of a TTCC resulted in improved student performance, particularly in their first clerkships. This is the first study we are aware of which has shown improved outcomes resulting from such an intervention and suggests that a TTCC may mitigate the common challenges encountered when students become clinical clerks.

Significance: Challenges in transitioning from pre-clinical to clinical learning environments are well described. Rather than circumventing the issue by applying a grading “curve,” the results of this study
suggest that a TTCC may improve student clerkship readiness. Further study is required to determine if a TTCC has an impact on student resilience and well-being in addition to their clinical performance.
**Title:** A summer prematriculation program to help students succeed in medical school

**Submission Type:** Research Highlights in Medical Education

**Submitting Author:** Katharina Brandl, Ph.D.

**Submitting Author Institution:**

**Purpose:** Medical schools with a diverse student body face the challenge of ensuring that all students succeed academically. Many medical schools have implemented prematriculation programs to prepare students from diverse backgrounds; however, evidence on their impact is largely lacking. In this study, we analyzed a prematriculation program implemented within the conceptual framework of cognitive load theory. Participants’ demographics were analyzed as well as the impact of the prematriculation program on Year 1 performance. Predictive validity of the program was assessed and compared to other traditional predictors, including grade point average (GPA) and Medical College Admission Test (MCAT) scores and subscores.

**Approach/Methods:** The prematriculation program is seven-weeks long with 118 scheduled instructional hours and consists primarily of live lectures (85% of instructional hours). Four major subject areas are taught including cardiovascular physiology, pulmonary physiology, immunology, and molecular biology/genetics. These four subject areas are defined as “supported” because they are directly related to specific Year 1 courses. Other Year 1 courses are defined as “non-supported” courses and are not included in the prematriculation program. Linear mixed effect models determined the impact of the prematriculation program, and multiple linear regression analysis assessed the predictive value of the overall score in the prematriculation program and other traditional predictors. Multivariable linear regression models were fit using backward variable elimination to identify a set of independent predictors of Year 1 performance.

**Results/Outcomes:** Demographics of students participating in the prematriculation program from 2013-2015 (n=75) revealed a significantly higher prevalence of academically disadvantaged students including older students, students with lower GPA and MCAT scores and students of racial and ethnic populations that are underrepresented in medicine (URiM), compared to non-participants (n=293) (p<0.05, unpaired t-test for continuous variables and qui-squared tests for categorical variables). Participants performed significantly better in Year 1 courses that were “supported” by the prematriculation program compared to courses that were “not supported” (p<0.0001). The overall performance in the prematriculation program correlated significantly with Year 1 performance and was found to be the strongest predictor (standardized beta-coefficient = 0.822, p<0.0001), outperforming the GPA and MCAT scores and subscores in strength of association.

**Discussion:** A prematriculation program teaching selected topics allows the students to develop a strong foundation for the underlying principles and then to better apply higher level problem solving. This layered approach allows students to recognize and consolidate the patterns into memory, rather than overwhelming the working memory with apparently unrelated elements. The student benefits from this reduction in the intrinsic load of these same topics when they are encountered within the full complexity of the Year 1 curriculum.
**Significance:** This study suggests that a prematriculation program can help students to succeed in the first year of medical school. We provide a general framework on how a prematriculation program can be structured and, most importantly, evaluated to ensure program effectiveness and ongoing improvements. The results have implications for medical schools seeking to implement or evaluate the effectiveness of their prematriculation program.