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# Preparing a Better Doctor: the C<sup>3</sup> curriculum and OSCE scores

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## Background

Since its introduction in 1975, the OSCE has been a standard mode of assessment of competency and clinical skills in medical schools (Harden, 2016). Similar doctoring courses designed to teach students clinical skills as well as provide professional development in the pre-clinical years are taught in medical schools across the country (Wilkes, Usatine, Slavin, & Hoffman, 1998; Dyrbye, Starr, Thompson, & Lindor, 2011). In 2013, the Virginia Commonwealth University's (VCU) School of Medicine (SOM) departed from a traditional "two plus two" curricular structure in which two years of basic science are followed by two years of clinical training and implemented an entirely new horizontally integrated curriculum for undergraduate medical students. As noted by Brauer (2015), the goal of integration is to connect the basic and clinical sciences, as well as facilitate the acquisition of skills and the retention of knowledge through repeated exposure and incremental development of concepts (Lindor et al., 2010). The VCU SOM's C<sup>3</sup> Curriculum was designed to be centered on the needs of the learner, clinically driven, and competency based.

The Foundations of Clinical Medicine (FCM) course in the traditional curriculum covered the core skills of doctoring, including professionalism, medical interviewing, physical examination, and clinical reasoning. The FCM course relied on instruction mainly through small group sessions. This was restructured into the Practice of Clinical Medicine (PCM) course for the new C<sup>3</sup> curriculum. The PCM course introduced learning blocks in which students received a lecture on the topic, followed by a small group session and then by a standardized patient workshop. This provided an opportunity to evaluate whether implementation of the C<sup>3</sup> curriculum affected the students' performance on the end-of-course Objective Structured Clinical Exam (OSCE).

## Methods

The last group of students completing the 24 month curriculum (Class of 2016) and the first group of students completing the 18 month curriculum (Class of 2017) were tested at the end of the course using the same set of OSCE cases and testing environment. The cases were designed to evaluate the ability of a student to obtain a focused history and physical examination and develop a differential diagnosis based on their findings. There were a total of 8 OSCE cases; each student completed 2 cases.

Cases were graded per a standardized checklist created for each case using the *Bates' Guide to Physical Exam and History Taking* textbook. Each checklist was comprised of the following categories: Chief Complaint (2%), History of Present Illness (30%), Medications and Allergies (5%), Pertinent Past Medical, Family, and Social Histories (3%), Physical Exam (30%), Education (5%) and Macy's Communication Scale (25%). Students received an overall OSCE case performance score based on the mean percent of the two cases.

The overall OSCE case performance score as well as the average of each individual case from the 24 month course were compared to those of the 18 month course. ANOVA was used to compare differences between overall OSCE mean scores based on case or category and class year. An interaction term of case and year was introduced to the ANOVA model to examine if the new C<sup>3</sup> curriculum had greater influence on certain case scores.

## Results

	Class of 2016	Class of 2017		Class of 2016	Class of 2017
<b>Cohort Size</b>	<b>196 Students</b>	<b>205 Students</b>	<b>Average OSCE score</b>		<b>Estimated higher by 7.7 points (P&lt;0.0001)</b>
<b>% Female</b>	<b>46%</b>	<b>46%</b>	<b>Average OSCE Category Score</b>		<b>Estimated higher by 2.2 points (p=0.002)</b>
<b>Average Age</b>	<b>24.5 years</b>	<b>25.8 years</b>			

**For both cohorts, Medial Meniscus tear, Pericarditis, and Pneumothorax were the high scoring cases and Angina, Cholecystitis, Migraine, Pancreatitis, and Pyelonephritis were the low scoring cases.**

	Class of 2016	Class of 2017
<b>High Individual Case Scores</b>	<b>Angina Medial Meniscus tear Pericarditis</b>	<b>Cholecystitis Migraine Pancreatitis Pneumothorax Pyelonephritis</b>
<b>High Individual Category Scores</b>		<b>Chief Complaint History of Present Illness Medications and Allergies Histories Physical Exam Education Communication</b>

## Conclusions

The improvement in both the overall average OSCE score and category score by the Class of 2017 cohort suggests a positive effect of the C<sup>3</sup> curriculum. For those few cases that the cohort in the Class of 2016 did better than the Class of 2017, we could improve the curriculum by emphasizing the clinical skills and diagnostic reasoning for those diagnoses.

We suspect that increased exposure to standardized patients may have resulted in improved OSCE scores by giving students familiarity with the testing environment throughout the course, resulting in less anxiety at the OSCE. Additionally, the PCM learning block structure provides multiple learning modalities (lecture, small group, standardized patient workshop) as compared to the prior FCM curriculum where teaching was primarily through small group instruction.

A potential limitation of the study is grader variability that routinely arises when using a pool of standardized patients. To limit this variability, the same detailed standardized checklist was used for the OSCEs for both cohorts. Another limitation of the study is that further cohorts cannot be studied as the end of course OSCE was changed for more subsequent classes.

In addition to changes in the PCM course, there were multiple other changes (integration of pre-clinical courses) in the pre-clinical curriculum which may have influenced student performance on the OSCEs.

## References

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