

Online Education Enhances Resident Education and Patient Care



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Background

The Division of Trauma, Surgical Critical Care, and Acute Care Surgery at University Hospitals Cleveland Medical Center is in its infancy and contributes to the education of residents from ten different residency programs. Our aim was to allow each resident on each of our services to gain the same foundational knowledge appropriate for their level of training. An online curriculum was created in addition to weekly conferences, bedside teaching, and education in the operating room. This ensures each resident receives similar educational opportunities on the respective services and addresses the variable background knowledge of each resident upon their arrival onto the service regardless of the patient or attending surgeon variations on the services.

Each module includes a voiced PowerPoint and/ or video presentation, supporting reading materials and a short quiz. Each resident is assigned one module per week of the rotation block.

This analysis is being conducted to analyze the engagement and performance of the participants, the impact the program had on their development and education, as well as determine the future direction of this endeavor.

Methods

All residents rotating through the Division were assigned orientation modules prior to the start of the rotation and one educational module per week of service through an online platform. Data was collected including training program, year of training, number of educational modules assigned, attempted and passed. Statistical analysis was performed using the Pearson Chi-squared test.

A survey was also sent to all residents who rotated in the Division for the first nine blocks of the academic year. Inquiries were made regarding construction and content of the modules, their engagement level, interaction with attending staff regarding the modules, and recommendations for future changes to the program.

Figure(s)

Training Program	Number of Assigned Modules (% total)	Engagement Rate (%)	Overall Pass Rate (%)	Attempted Pass Rate (%)
General Surgery (UHCMC)	240 (65.8)	89.6	58.3	65.1
Emergency Medicine	32 (8.8)	59.4	56.3	94.7
Family Medicine	19 (5.2)	57.9	15.8	27.3
General Surgery (non-UHCMC)	12 (3.3)	100	83.3	83.3
Oral Maxillofacial Surgery	15 (4.1)	73.3	60	81.8
Interventional Radiology	12 (3.3)	16.7	8.3	50
Urology	11 (3)	90.9	63.6	70
Plastic Surgery	12 (3.3)	58.3	33.3	57.1
Vascular Surgery	8 (2.2)	87.5	50	50
Orthopedic Surgery	4 (1.1)	100	75	75

Clinical Year of Training	Number of Assigned Modules (% total)	Engagement Rate (%)	Overall Pass Rate (%)	Attempted Pass Rate (%)
1	130 (35.6)	78.5	42.3	53.9
2	105 (28.7)	92.4	71.4	77.3
3	39 (10.7)	79.5	51.3	64.5
4	72 (19.7)	83.3	59.7	71.7
5	19 (5.2)	42.1	31.6	75

Training Program	Number of Assigned Modules (% total)	Engagement Rate (%)	Overall Pass Rate (%)	Attempted Pass Rate (%)
Surgical	302 (82.7)	88.1	58.6	66.5
Non-Surgical	63 (17.3)	50.8	34.9	68.8

Rotation	Number of Assigned Modules (% total)	Engagement Rate (%)	Overall Pass Rate (%)	Attempted Pass Rate (%)
Trauma	135 (37)	81	59.9	73.9
Acute Care Surgery	129 (35.3)	87.8	44.3	50.4
Surgical Critical Care	101 (27.6)	72.5	54.9	75.7

Conclusions

Improvements in knowledge were made and translated to the bedside, improving care for our patients.

There was a statistical difference between the residents of surgical and non-surgical training programs in regards to engagement and performance as well as all analyses between the three individual rotations. Enhancements to the program going forward will be made based on the results of this data.

Future changes may include distinct modules for residents in non-surgical training programs more applicable to their specific program and educational needs, continued development of new modules, and improvement of current modules all based on resident feedback from the survey and data analysis. Further analysis of individual modules will be conducted and recommendations for improvement made to the authors. Integration of the modules into in-person teaching by the attending physicians will also be encouraged.

Results

Evaluation of quiz engagement and performance was executed based on training program, academic training year, and surgical versus non-surgical based training programs.

Engagement was defined as completing the assigned quiz. Overall pass rate evaluated the pass rate of all assigned quizzes while attempted pass rate evaluated the pass rate of completed quizzes.

When evaluating the individual services, engagement ($p=.008$), overall pass rate ($p= .000$) and attempted pass rate ($p= .000$) all reached statistical significance.

Engagement ($p= .0006$) and overall pass rate ($p= .0298$) were statistically significant when comparing residents enrolled in surgical versus non-surgical training programs but the attempted pass rate was not.

The anonymous survey had a 38% response rate. Of the resident respondents, twelve rotated on the Acute Care Surgery Service, ten on the Surgical Critical Care Service and fourteen on the Trauma Service. Fifteen residents rotated on one service, six residents rotated on two services, and three residents rotated on all three services. Several residents rotated for more than one block on the same service. 95.8% of respondents fully engaged in the modules and quizzes. 75% felt the length of the material was appropriate and 83.3% felt the content was suitable for their training needs. 81.1% of residents with previous exposure to rotations within the Division agreed that the modules enhanced the learning experience.

The modules did not affect interactions between trainees and attending physicians and the dialogue between residents and attending physicians regarding module content was minimal.

37.5% indicated that the modules improved their performance on their in-service exam. This subset included residents from General Surgery, Family Medicine and Orthopedic Surgery. Seventy five percent of the residents applied knowledge gained from the virtual modules into clinical practice since engaging the process and 62.5% indicated this type of education should continue to be offered by our Division and the same number thought this should be offered by other educational services throughout their training.