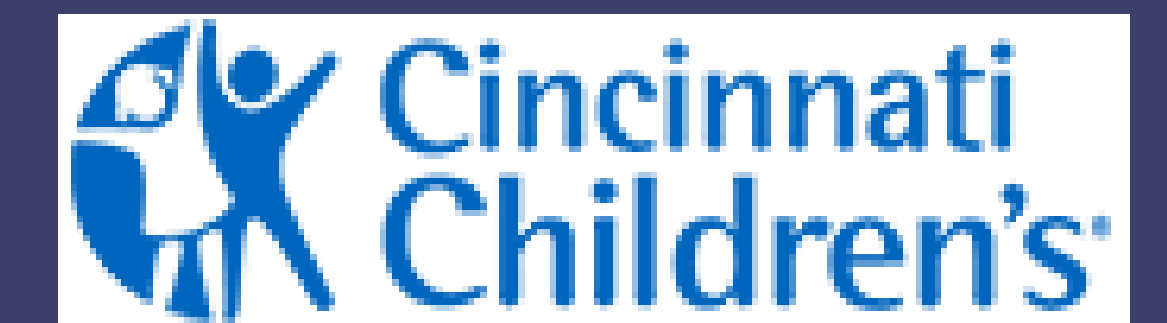


# The impact of a resident-run review curriculum and USMLE scores on the Otolaryngology in-service examination



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## Abstract

### Objective:

Determine the impact of USMLE Step 1 scores and the institution of a dedicated board review curriculum on Otolaryngology training examination scores.

### Study design:

Retrospective cohort.

### Methods:

We reviewed the American Board of Otolaryngology Training Examination (OTE) scores for an otolaryngology residency program between 2005 and 2016. USMLE Step 1 scores were obtained. In 2011 a resident-run OTE review curriculum was instituted with the goal of improving test scores. Scores were compared before and after curriculum institution. Linear regression was performed to evaluate for predictors of OTE scores.

### Results:

47 residents were evaluated, 24 before and 23 after instituting the curriculum. A moderate correlation existed between USMLE step 1 scores and OTE scores for all years. For PGY-2 residents, mean OTE scores improved from 25<sup>th</sup> percentile to 41<sup>st</sup> percentile after institution of the board review curriculum ( $p < 0.001$ ). No significant improvement was noted for PGY 3-5 residents. On linear regression, after controlling for USMLE step 1 scores, a dedicated board review curriculum predicted a 23-point percentile improvement in OTE scores for PGY-2 residents ( $p = 0.016$ ). For other post-graduate years, the review curriculum was not related with a significant score improvement. Higher USMLE step 1 scores were associated with improved OTE scores for PGY 4-5 residents.

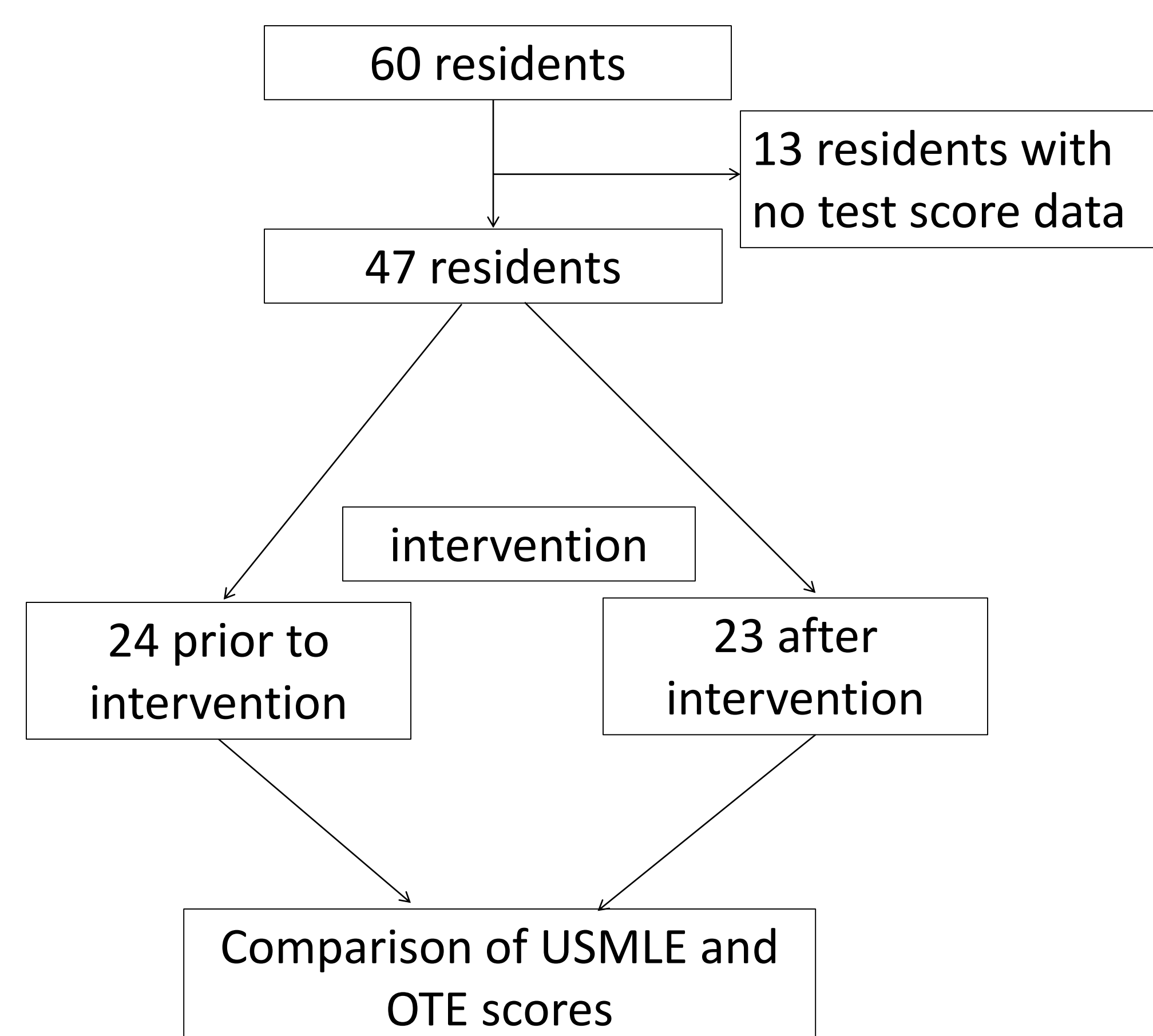
### Conclusion:

USMLE scores are moderately correlated with OTE performance. A dedicated OTE review curriculum may improve OTE scores for PGY-2 residents, but such a curriculum may not be as beneficial for PGY 1 and PGY 3-5 residents.

## Introduction

- The American Board of Otolaryngology sponsors in-service training examination (OTE) every year
- There is a correlation between USMLE scores and in-service examination scores in other specialties<sup>1,2</sup>
- Poor performance on the OTE correlates with poor performance on the Board qualifying examination<sup>3</sup>
- Pedagogic features that influence OTE scores are poorly studied, but the institution of a learner-centered curriculum may benefit test-takers<sup>4</sup>

## Methods and Materials



- Retrospective cohort of OTO-HNS residents between 2005 and 2016
- USMLE step 1, 2 and 3 scores obtained for all residents
- Intervention instituted in 2011
  - Structured OTE review curriculum conceptualized and run by PGY-4 and PGY-5 residents
  - Weekly 2 hour learning sessions
  - Lecture material provided before review session
  - Focused on interactive question and answer sessions with time for discussion ("Flipped" classroom)
    - Discussion of "high-yield" topics as determined by senior residents
    - Topics discussed spanned every major Otolaryngology subspecialty
- OTE scores prior to intervention compared to scores after intervention
  - Controlled for USMLE scores
- Correlation analysis performed for USMLE scores and OTE scores
- Multivariate analysis performed to control for effect of USMLE scores on OTE scores

## Results

Table 1: Mean USMLE scores and OTE scores by class (95% Confidence interval)

	Step 1	Step 2	Step 3	OTE percentile
Overall	243±4.2	248±4.4	226±4.2	42±12.5
PGY-1				8.6±3.3
PGY-2				28.6±6.0
PGY-3				54±7.5
PGY-4				66.7±6.6
PGY-5				77±5.0

- Small difference between USMLE step 1 scores prior to intervention (mean 241) and after intervention (mean 249) ( $p = 0.02$ )
- OTE percentiles improved with year of training (Table 1)

Table 2: Correlation between USMLE scores and OTE (R value)

	Step 1	Step 2	Step 3
PGY-1	0.33	0.43	0.38
PGY-2	0.45	0.55	0.4
PGY-3	0.4	0.55	0.45
PGY-4	0.57	0.4	0.71
PGY-5	0.65	0.39	0.68

- A moderate correlation exists between USMLE scores and OTE scores for all years of residency (Table 2)

Table 3: OTE scores before and after institution of board review curriculum

	Mean OTE percentile scores before review	Mean OTE percentile scores after review	Difference (95% CI)	p value
PGY-1	7.9	11.3	3.4±10.2	0.51
PGY-2	25.3	41.3	16.1±16.0	0.05*
PGY-3	55.2	46	-9.2±27.2	0.5
PGY-4	66.3	69.3	3.0±30.0	0.84
PGY-5	73.4	89.3	15.4±19.6	0.11

- For PGY-2 residents, mean national percentile increased from 25% prior to intervention to 41% after intervention ( $p = 0.05$ ) (Table 3)
  - After applying Bonferroni correction this finding lost statistical significance at  $p < 0.05$
- On multivariate regression controlling for both USMLE score and effect of the intervention:
  - PGY-2 residents: presence of intervention was predictive of a 23 percentile point gain on OTE
  - PGY-4 residents: Seven point increase in USMLE step 1 score is predictive of a one percentile point gain on the OTE
  - PGY-5 residents: Fifteen point increase in USMLE step 1 score is predictive of one percentile gain on the OTE.

## Discussion

The use of a "flipped" classroom with focus on active learning is a valuable pedagogic tool in many fields

-Goal is to encourage active learning  
-Our intervention attempted to institute this into the resident didactic curriculum

After intervention, OTE percentile scores improved for PGY-2 residents

-Surprisingly, effect limited to junior residents, but this is consistent with literature in other specialties<sup>5</sup>  
-Structured review may be more useful for residents earlier in training with limited clinical experience to build a knowledge base  
-Allows Junior residents to identify deficiencies in topical knowledge and focus on these areas in independent study  
-Reh et al found that a structured review improves OTE examination scores for all post-graduate years<sup>4</sup>

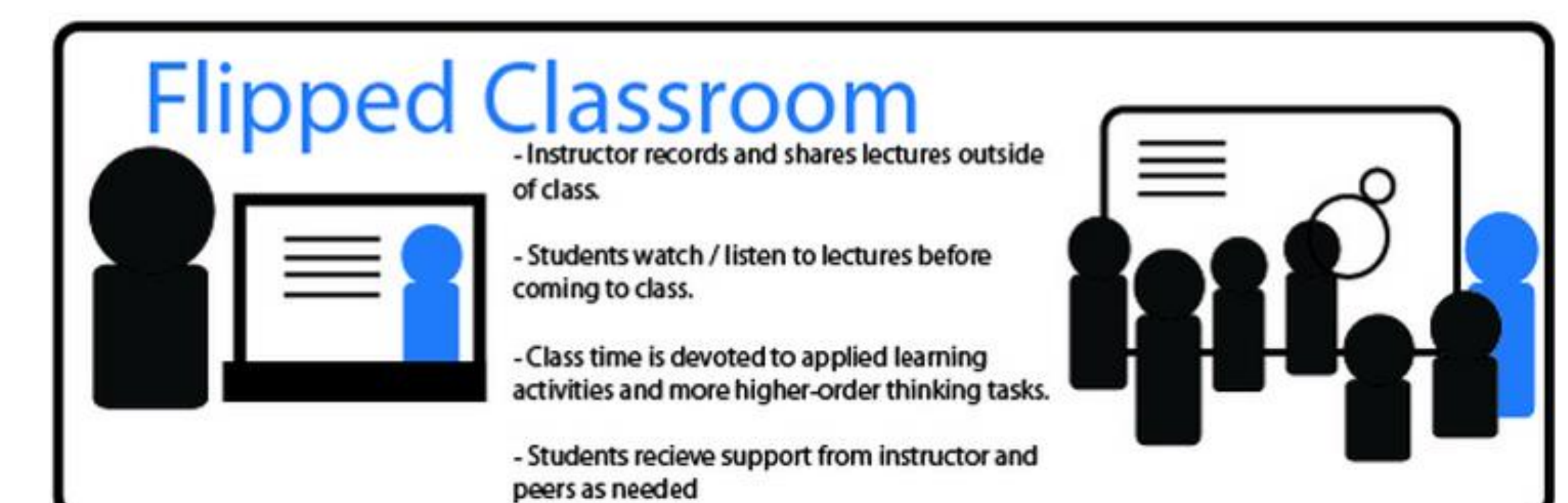
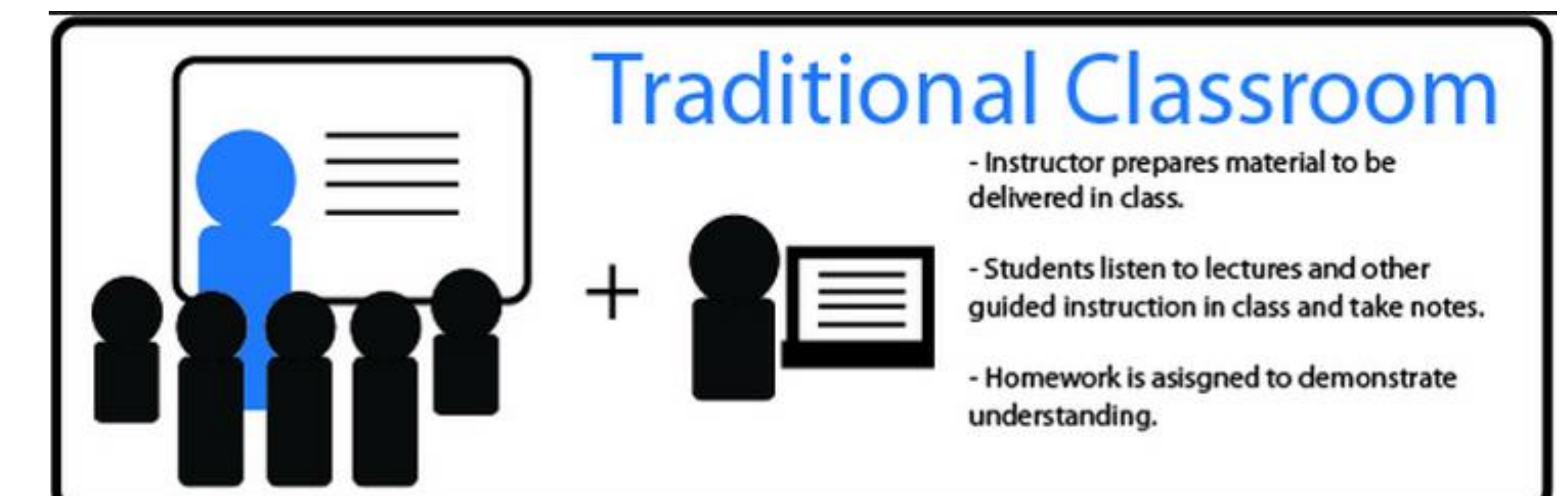
\*This study did not account for USMLE scores along with structured review

USMLE scores correlate with OTE scores

-Those who come into medical education as good standardized test-takers retain these skills through residency  
-PGY-4 and PGY-5 residents may have an adequate knowledge base and thus test-taking skills play a larger role in OTE outcome as opposed to fundamental knowledge base limitations

Limitations

-Small sample size, retrospective, single-institution



<http://www.slu.edu/ctl/resources/teaching-tips-and-resources/flipped-classroom-resources>

## Conclusions

- USMLE scores are moderately correlated with OTE scores and are a predictor of OTE scores for PGY-4 and PGY-5 residents.
- A dedicated board review curriculum based on the flipped classroom paradigm improves OTE scores for PGY-2 residents, but after controlling for USMLE step 1 scores, it does not significantly improve OTE scores for PGY-3, PGY-4 and PGY-5 residents, indicating that a ceiling effect may exist.

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