

# Cap Assisted Colonoscopy Enhances Quality Based Competency in Colonoscopy Among Trainees: A Randomized Controlled Trial

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## I. BACKGROUND

- Competency assessment in colonoscopy trainees have traditionally been informal and subjective.
- New validated metrics such as the Assessment of Competency in Endoscopy (ACE) tool have found that the minimum procedure threshold to reach competency may be higher than once assumed.
- Cap assisted colonoscopy (CAC), in which a short transparent cap is attached to the end of the endoscope, may be a practical method to improve quality based competency measures in trainees. However, evidence to support this practice is currently lacking.

## II. AIMS

- We compared quality based competency measures in CAC versus standard non cap colonoscopy (SC) among trainees with no prior experience in a randomized controlled trial.

## III. METHODS

### SETTING

- Single safety net university teaching hospital in the United States.

### INCLUSION CRITERIA

- All colonoscopies performed by three gastroenterology fellows without prior colonoscopy experience in the first three months of training.

### EXCLUSION CRITERIA

- Age < 18 or > 90, pregnant, history of colon resection, diverticulitis within 1 month, current symptoms of colonic obstruction, severe hematochezia, referral for endoscopic mucosal resection, or unsedated procedure.

### STUDY DESIGN

- Patients were randomized to either CAC or SC in a 1:1 fashion.
- Quality metrics and ACE tool scores were recorded by attending physicians grading each colonoscopy in real time.

## IV. OUTCOMES

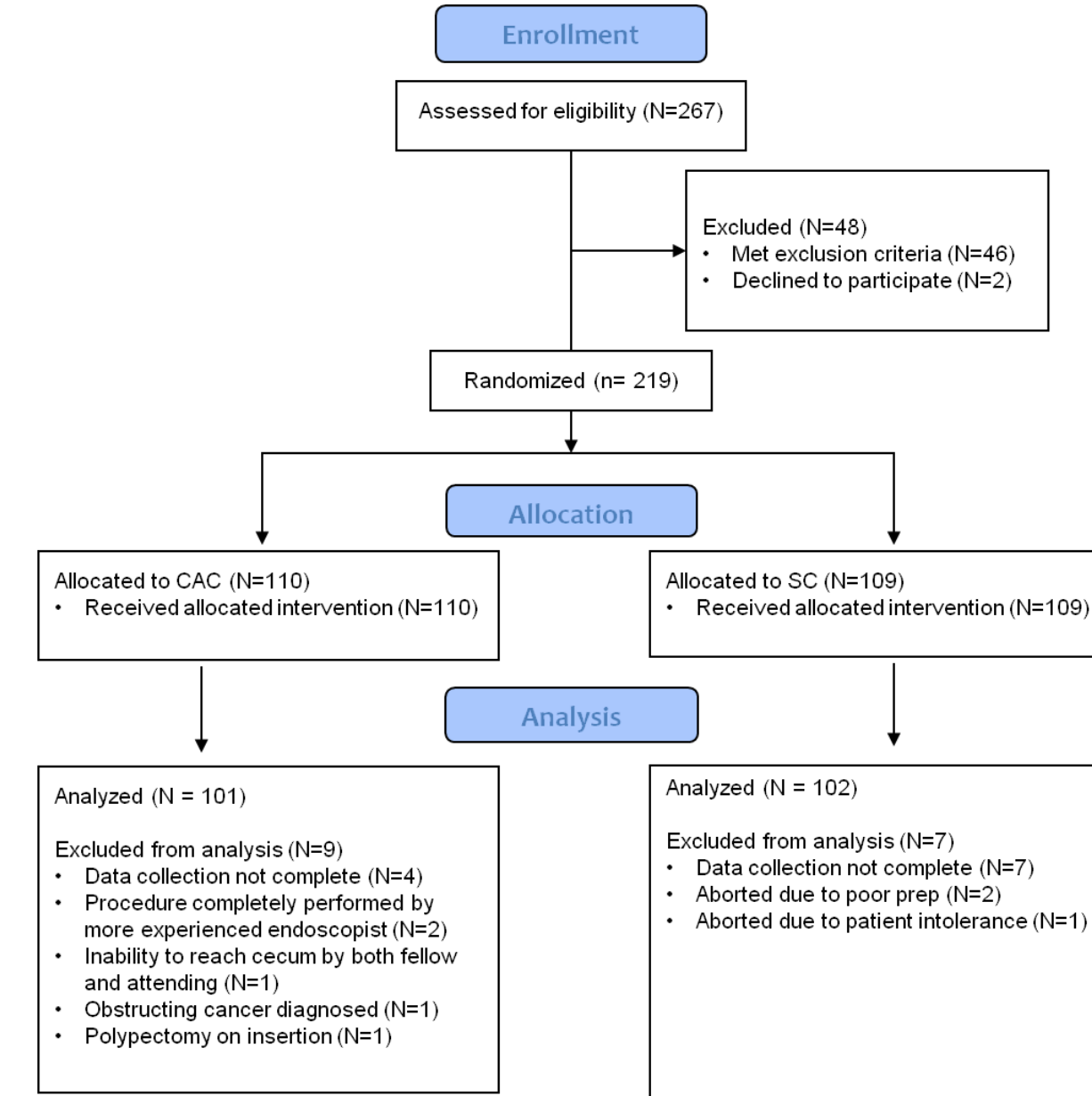
### PRIMARY

- Cecal intubation time (CIT)

### SECONDARY

- Independent cecal intubation rate (ICIR)
- Polyp detection rate (PDR)
- Polyp miss rate (PMR)
- Adenoma detection rate (ADR)
- ACE tool scores

## V. STUDY FLOW



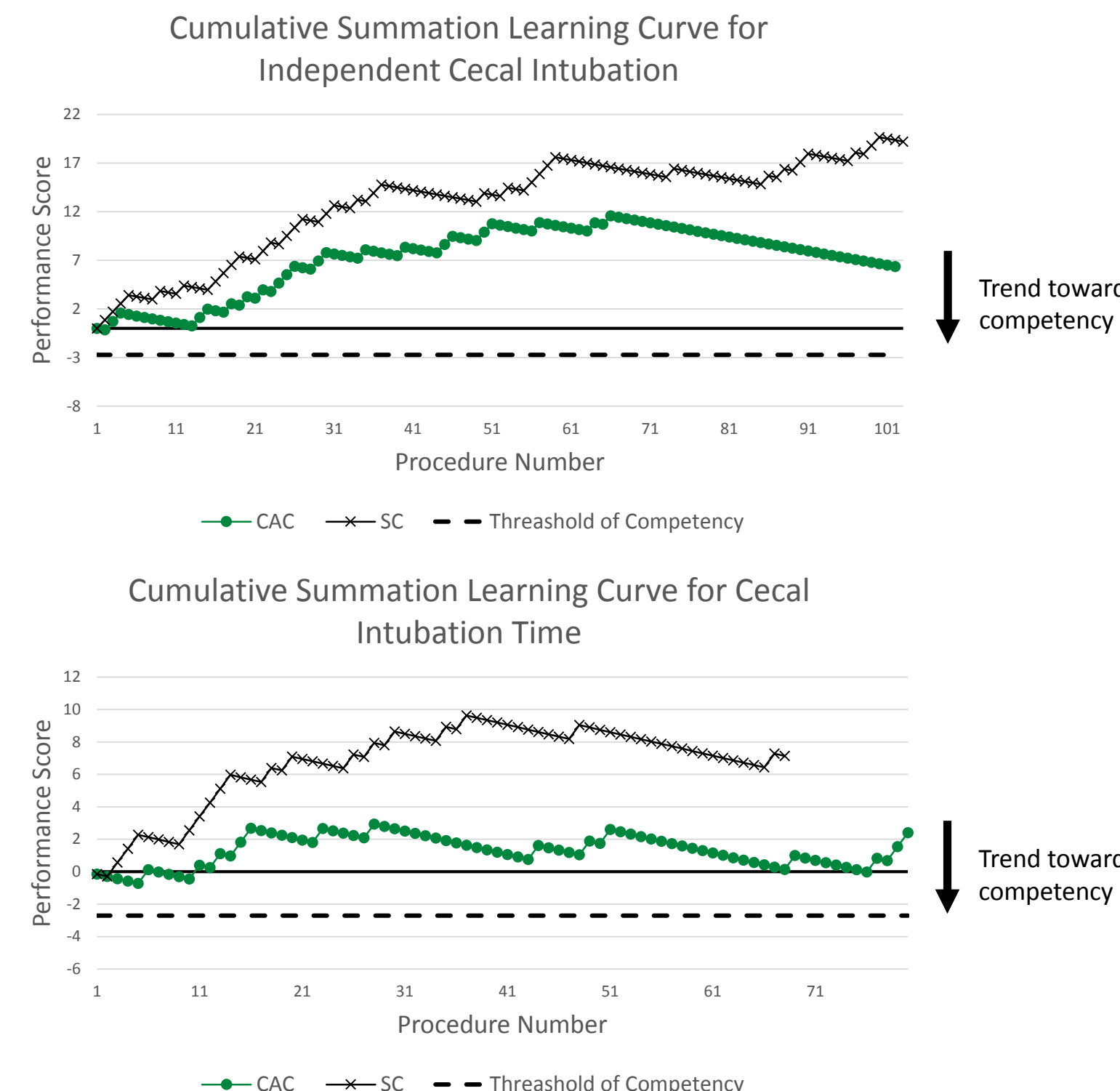
## VI. BASELINE CHARACTERISTICS

	CAC (N=101)	SC (N=102)
Age, y [95% CI]	55.6 [53.8, 57.32]	55.8 [54.0, 57.7]
Sex, n (%)		
Male	29 (36.3)	37 (28.7)
Race, n (%)		
Hispanic	64 (63.4)	53 (52.0)
Black	19 (18.8)	32 (31.4)
White	10 (9.9)	8 (7.8%)
Asian	8 (7.9)	9 (8.8)
BMI, kg/m <sup>2</sup> [95% CI]	28.6 [27.6, 29.5]	29.2 [28.2, 30.2]
Procedures by 1 <sup>st</sup> year trainee, n (% of group)		
Fellow 1	30 (29.4)	30 (29.7)
Fellow 2	36 (36.3)	37 (35.6)
Fellow 3	35 (34.3)	35 (34.7)
Indication, n (% of group)		
Diagnostic	51 (50.5)	55 (53.9)
FIT positive	34 (33.7)	28 (27.4)
Surveillance	14 (13.9)	16 (15.7)
High Risk Screening	2 (2.0)	3 (2.9)
Boston Bowel Preparation Scale		
Mean [95% CI]	8.69 [8.54, 8.84]	8.44 [ 8.20, 8.68]
Score ≥ 6, n (% of group)	99 (97.1%)	101 (100%)

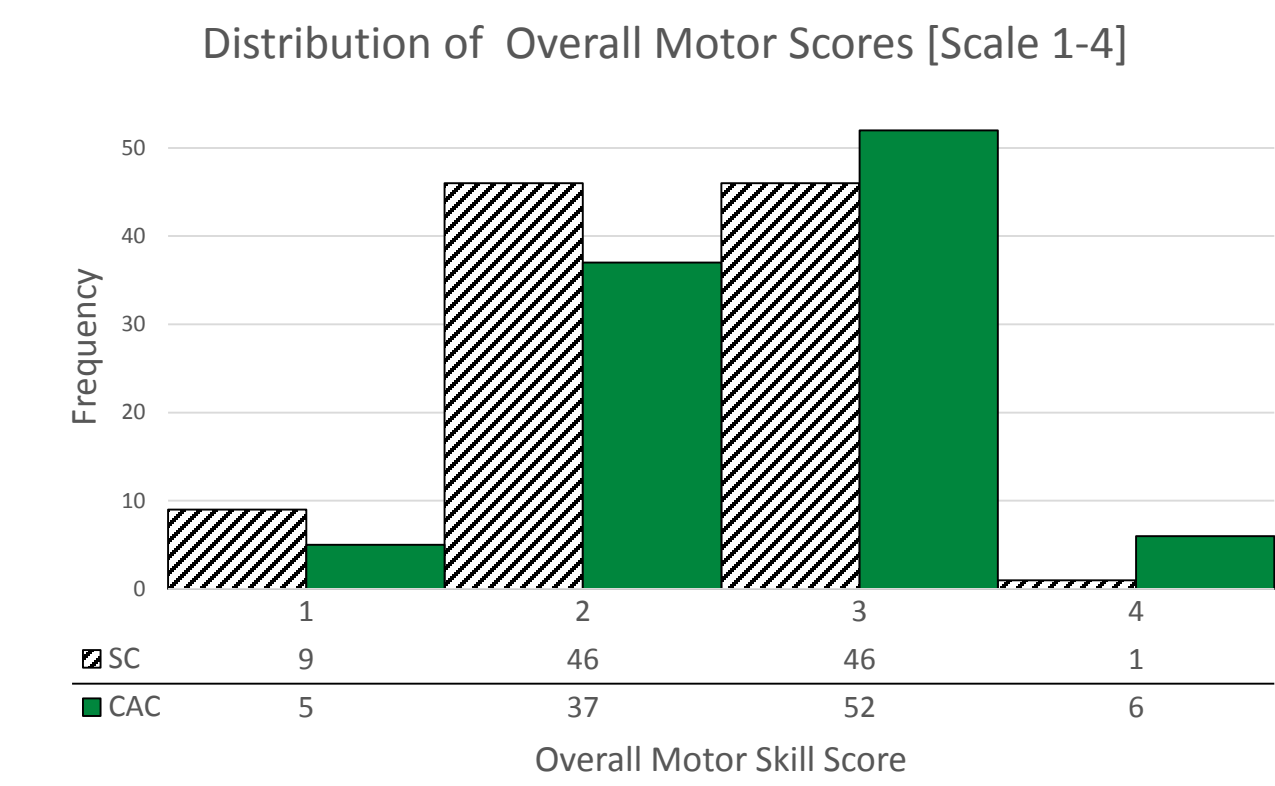
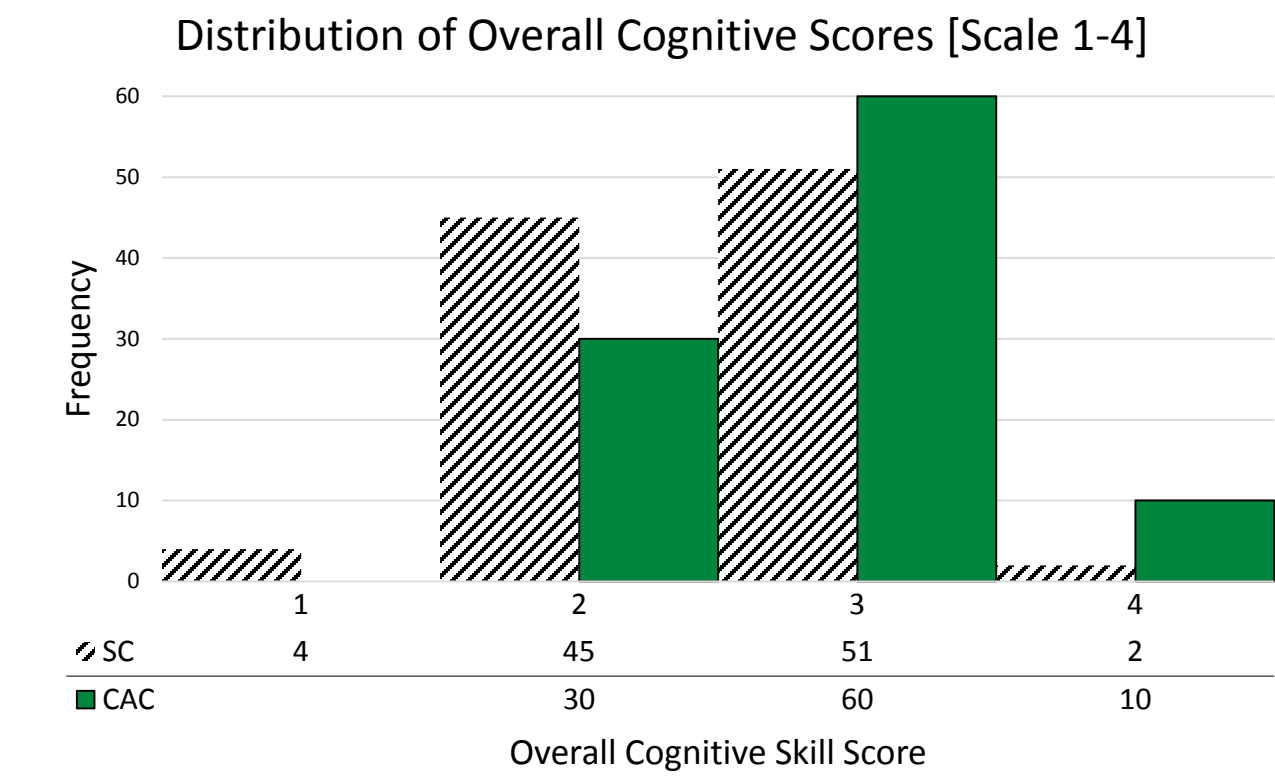
## VII. RESULTS

	CAC (N=101)	SC (N=102)	P value
Cecal intubation time, min, mean [95% CI]	13.7 [12.3, 15.2]	16.5 [14.7, 18.2]	0.02
Independent cecal intubation rate, %	79.2	66.7	0.04
PDR, %	53.5	53.9	0.95
PMR, %	27.8	26.9	0.92
ADR, %	37.6	43.1	0.42
Overall ACE cognitive skills, mean [95% CI]	2.8 [2.68, 2.92]	2.5 [2.38, 2.62]	< 0.01
Overall ACE motor skills, mean [95% CI]	2.59 [2.45, 2.73]	2.38 [2.25, 2.51]	0.03

## VIII. LEARNING CURVE ANALYSIS



## IX. ACE TOOL SCORES



### Comparison of Individual ACE Scores [Scale 1-4]

	N	CAC, mean [95% CI]	SC, mean [95% CI]	P value
<b>Cognitive Skills</b>				
Knowledge of indication and medical issues	201	3.33 [3.19, 3.48]	3.06 [2.91, 3.21]	0.01
Management of patient discomfort	200	2.92 [2.77, 3.07]	3.00 [2.38, 3.62]	0.80
Lumen identification	202	2.85 [2.71, 2.99]	2.53 [2.41, 2.67]	< 0.01
<b>Pathology</b>				
identification and interpretation	121	2.70 [2.50, 2.89]	2.55 [2.39, 2.70]	0.21
Identifying location of pathology	107	2.88 [2.72, 3.04]	2.75 [2.57, 2.93]	0.31
Knowledge of therapeutic tools	100	2.71 [2.49, 2.93]	2.53 [2.32, 2.73]	0.22
<b>Motor Skills</b>				
Use of air, water, and suction	202	2.75 [2.59, 2.90]	2.53 [2.39, 2.66]	0.03
Scope steering technique	202	2.87 [2.72, 3.01]	2.67 [2.54, 2.79]	0.04
Fine tip control	202	2.74 [2.58, 2.90]	2.46 [2.32, 2.60]	0.01
Loop reduction techniques	202	2.72 [2.54, 2.90]	2.42 [2.24, 2.60]	0.01
Visualization of mucosa	199	2.94 [2.79, 3.09]	2.71 [2.56, 2.86]	0.03
Ability to apply therapeutic tools	101	2.88 [2.71, 3.05]	2.56 [2.36, 2.76]	0.02

## X. KEY FINDINGS AND CONCLUSIONS

WHEN COMPARED WITH STANDARD COLONOSCOPY BY NOVICE TRAINEES, CAP ASSISTED COLONOSCOPY SIGNIFICANTLY IMPROVES

- Cecal independent time
- Independent cecal intubation rate
- Both overall cognitive and overall motor scores on the ASGE Assessment of Competency in Endoscopy (ACE) tool
- All six individual motor skills scores on the ACE tool
- Two of six individual cognitive skills scores on the ACE tool
- Learning curve trend toward competency on cumulative summation analysis

Cap assisted colonoscopy did not significantly improve adenoma detection rate, polyp detection rate, or polyp miss rate.

Cap assisted colonoscopy did not perform significantly worse than non cap standard colonoscopy in any outcome.