

# Get With the Rhythm - Telemetry Education in Internal Medicine Residency

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## BACKGROUND

- With rising patient acuity in hospitals, telemetry is a widely used resource that has the potential to provide real-time information about life-threatening conditions helping guide clinicians' management decisions. However, this relies on comfort with and correct interpretation of electrocardiographic monitoring. Multiple studies of both physicians and nurses have demonstrated poor performance in assessment of rhythms from ECG monitoring making education a crucial aspect in the utility of telemetry.
- In 2017 the American Heart Association published an update on practice standards for electrocardiographic monitoring in hospital settings, which specifically addresses education of staff. It recommends the need for both didactic and hands-on learning, and from web-based to peer to peer teaching. However, there remains no standardized practice on telemetry training, especially for medical residents, who are part of the first-line in telemetry evaluation.
- Among a sample of our Internal Medicine residents, 90% reported no formal telemetry teaching, and 10% had no formal or informal telemetry education. Only 50% of residents reviewed telemetry daily.
- Our goal was to design and implement cardiac monitoring education for medical residents in order to help residents feel more comfortable with and be better equipped to navigate and assess telemetry. Through formal education, our overarching aims are to improve patient care through telemetry monitoring and appropriate telemetry utilization.

## AIM

- Our aim was to design and implement cardiac monitoring education for medical residents in order to help residents feel more comfortable navigating and assessing telemetry.
- Our objective was to create and pilot a telemetry education video among Internal Medicine residents (from March to May 2018) resulting in a 75% increase in ability to demonstrate essential telemetry skills as determined by a pre and post video assessment.

## INTERVENTION

- We created an eight minute video, narrated by cardiologist Dr. Yair Lev, which reviews the basics of navigating telemetry – trend review, wave review, and alarm review.
- Example tasks included how to find patients, use trend review, check R-R irregularity, adjust time frames and scale, use wave review and alarm review, use calipers, and assess for artifact.
- Our team assessed telemetry navigation and evaluation skills among Internal Medicine residents in real-time by seeing if they could complete different tasks on a telemetry monitor within the frame of clinical scenarios.
- Following the initial evaluation, residents were given a link to watch the telemetry video. They were then reassessed with the same evaluation within 1 week.
- Residents were scored based on a binary system of ability or inability to complete each task. Qualitative data regarding comfort with telemetry (1- uncomfortable, 10- expert) was also gathered pre- and post-video.

## VIDEO



See the video here: <https://goo.gl/gAerGG>

## ASSESSMENT

### Trend Review

70 y/o patient with HTN presents with palpitations concerning for atrial fibrillation

- Bring up a patient from a different telemetry unit
- Pull up heart rate graph from last 24 hours
  - Show optimum heart rate range
  - Show HR range over last 4 hours
- Determine the percentage of time the patient is in atrial fibrillation

### Wave Review

67 y/o patient with sepsis being evaluated for tachycardia

- Bring up the wave strip, choose only lead II
- Zoom in on the P waves (change vertical scale)
- Space out the RR interval to see each QRS better (change horizontal scale)
- Use calipers to measure the R-R interval
- Use calipers to assess if the R-R interval is regular or irregular

### Alarm Review

78 y/o patient with CHF who presented with syncope being evaluated for NSVT

- Did patient have any NSVT overnight? (bring up alarm review)
- Review alarms for last 24 hours
- Identify the most common misidentified cause of NSVT (identify artifact)
- Print a strip to bring to rounds

## RESULTS

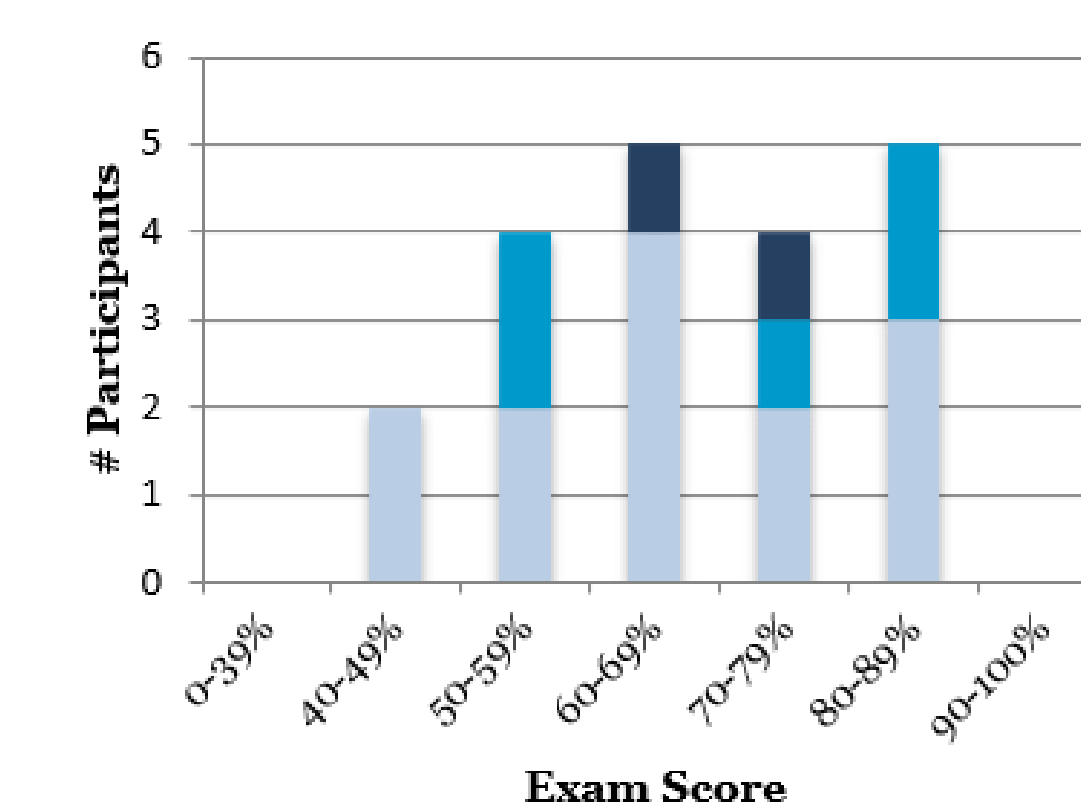
- There were 20 participants. Each participant watched the video 1 time only.
- Subject characteristics:
  - 13 PGY 1, 5 PGY 2, 2 PGY 3
  - 10% had formal telemetry training (2/20) and 90% had informal telemetry training (18/20) prior to the intervention
  - 50% (10/20) report looking at telemetry every day, 25% (5/20) look most days, 25% (5/20) look some days

	Pre-video	Post-video	% Improvement
Exam Score	67.5	99.6	47.6
Mean Comfort level (1-10)	6.1	8.7	43.8

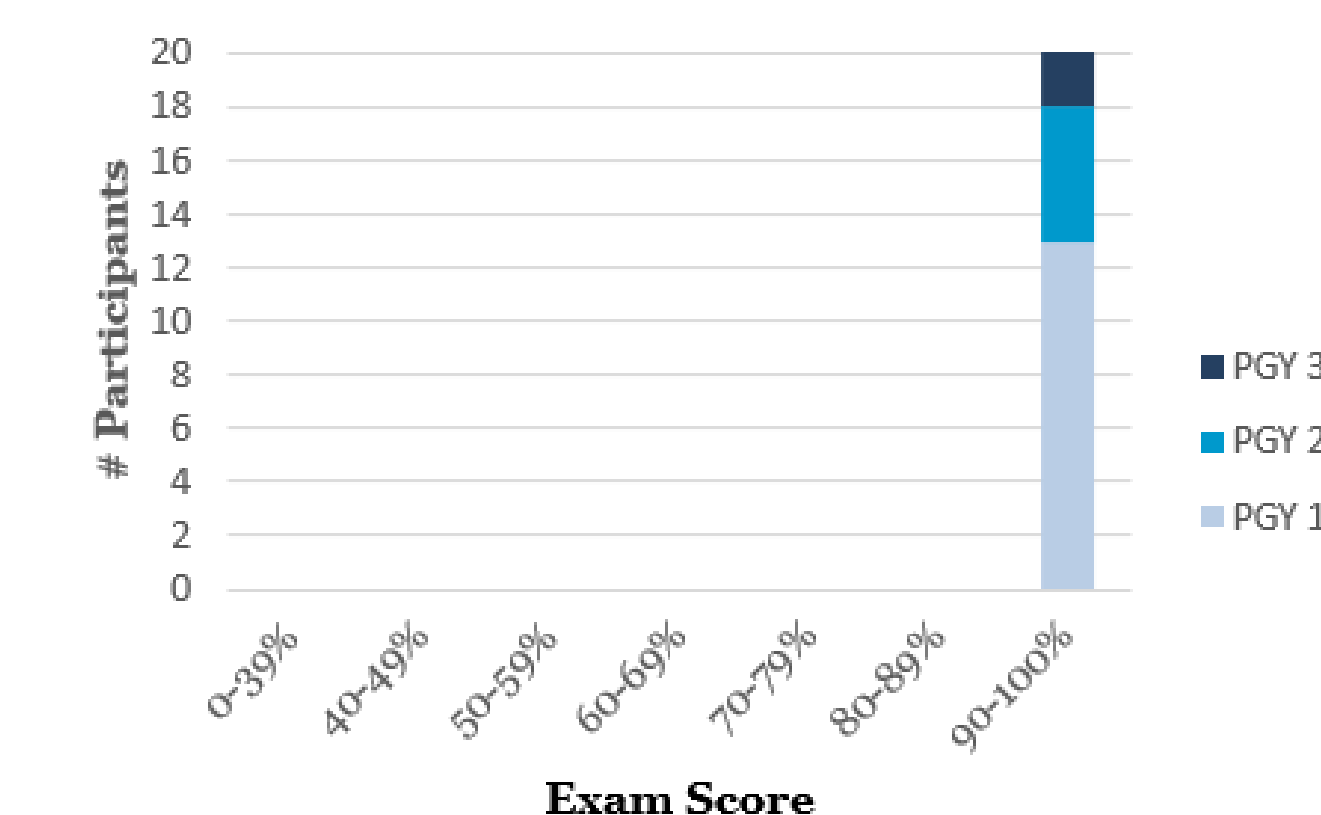
- Comfort level with telemetry pre-test: mean 6.1, median 6.5, mode 7
- Comfort level with telemetry post-test: mean 8.5, median 8.5, mode 9
- Data was analyzed using a T-test for the change in pre- and post-intervention measures. There was a statistically significant effect for both:
  - Test scores:  $t(19) = 10.27, p < 0.00001$
  - Subjective comfort:  $t(19) = 9.67, p < 0.00001$

## DATA

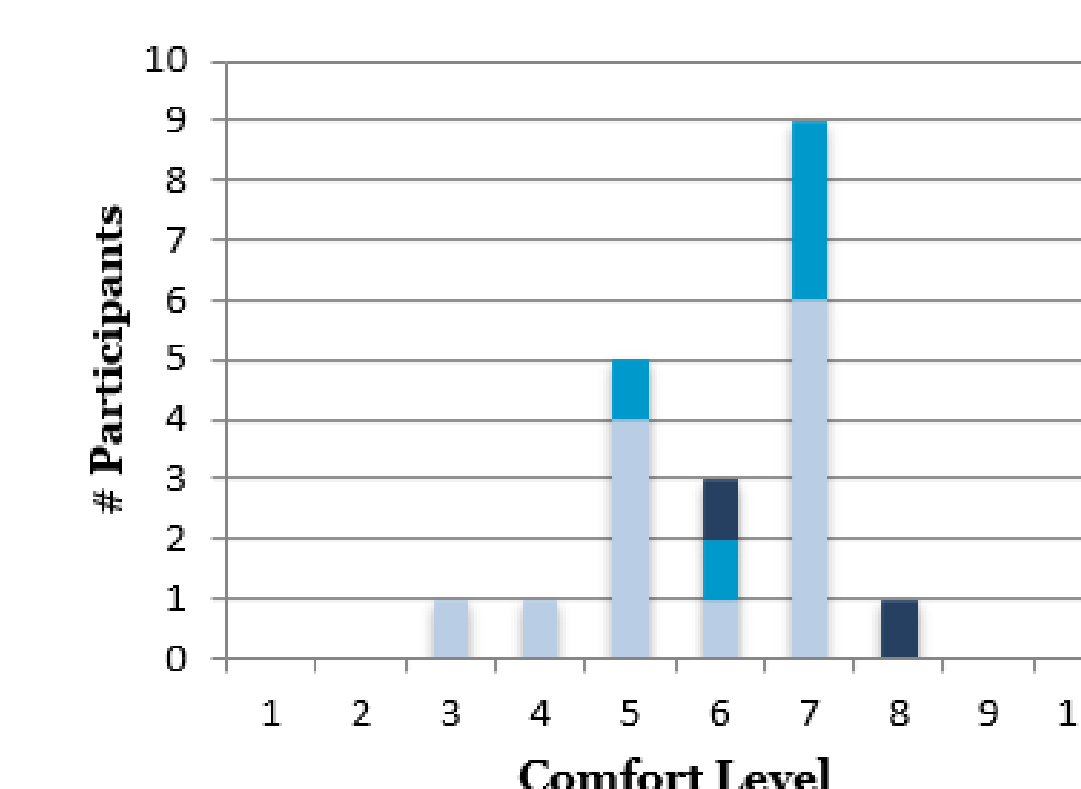
### Pre-video Assessment



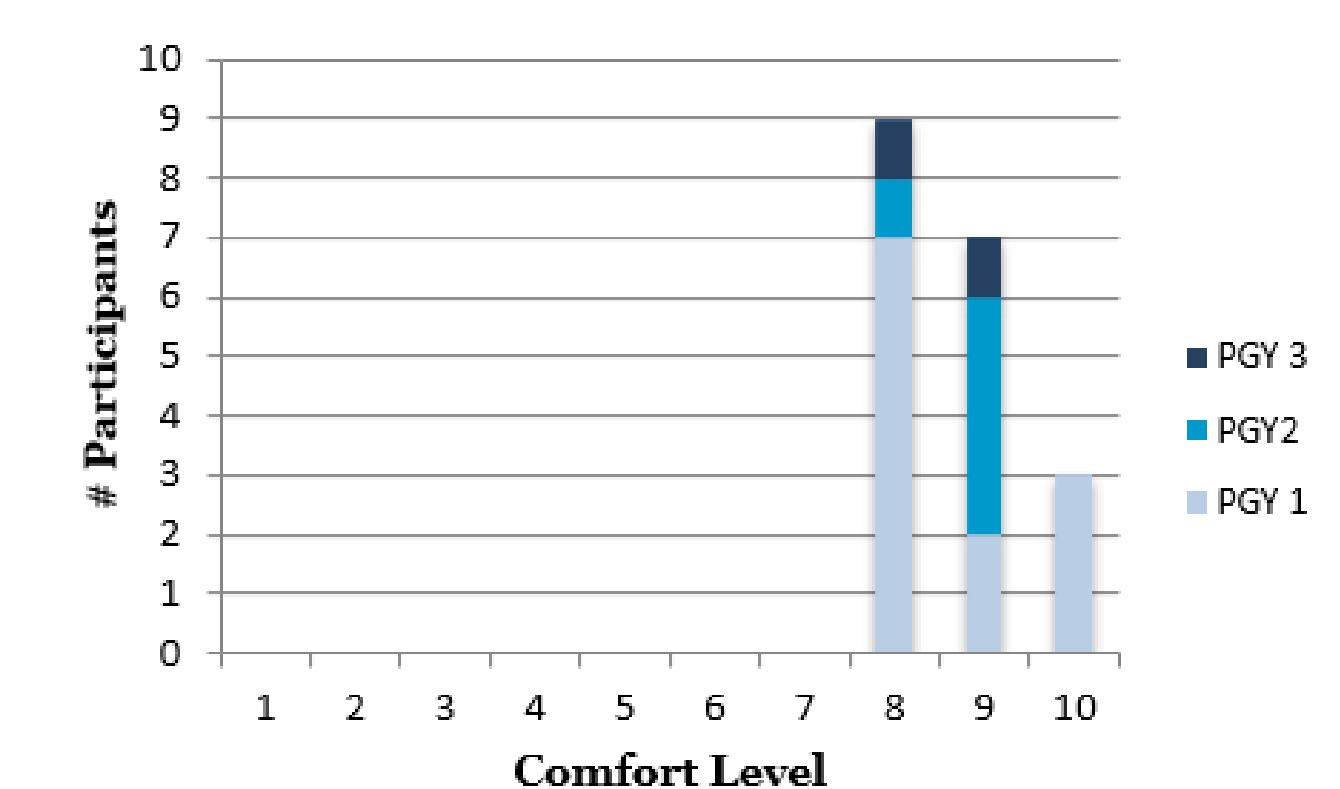
### Post-video Assessment



### Pre-video Comfort Level



### Post-video Comfort Level



## DISCUSSION

- The objective post-test mean was 99.6% ( $p < 0.00001$ ), demonstrating excellent telemetry proficiency after the intervention in virtually all participants. Additionally, subjective comfort with telemetry interpretation improved to likert 8.5 post-intervention, from a baseline 6.1 ( $p < 0.00001$ ).
- We believe the subjective increased proficiency may be of clinical importance, as confidence in individual skills may lead to more frequent discussion of telemetry findings on rounds, with subsequent benefit to patient care.
- We did not reach our targeted aim of a 75% increase in ability to demonstrate essential telemetry skills, however this most likely reflects a higher baseline performance than anticipated.
- Possible limitations of our current intervention include the lack of ability to test for long-term retention, and that the PGY 1 residents were already 9-11 months into residency training.
- We intend to repeat the same assessment in PGY 1 trainees within 1-3 months of starting residency with a second assessment 2 months later to test retention. We anticipate a greater overall improvement in telemetry proficiency, with the added benefit of earlier competency in an essential skillset.
- The telemetry video will be included as a resource in the formal Internal Medicine curriculum moving forward.
- Although beyond the scope of our current project, we believe it would be interesting at an institutional level to study how telemetry utilization and documentation changes after a telemetry education initiative.

## REFERENCES

- Funk M, Fennie KP, Stephens KE, et al. The PULSE Site Investigators . Association of implementation of practice standards for electrocardiographic monitoring with nurses' knowledge, quality of care, and patient outcomes: findings from the Practical Use of the Latest Standards of Electrocardiography (PULSE) trial. *Circ Cardiovasc Qual Outcomes*. 2017;10:e003132.
- Sandau KE, Funk M, Auerbach A, et al; on behalf of the American Heart Association Council on Cardiovascular and Stroke Nursing; Council on Clinical Cardiology; and Council on Cardiovascular Disease in the Young . Update to practice standards for electrocardiographic monitoring in hospital settings: a scientific statement from the American Heart Association. *Circulation*. 2017;136:e273–e344.