

# Effect of Manual Over scoring on Automated Analysis of Level 3 Home Sleep Testing (HST) Results

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## Introduction

HSTs do not record sleep and only includes information regarding disordered breathing events per hour of monitoring time. Inability to assess events associated with arousals may underestimate disease severity. Argument for using automated REI-A versus (REI-M) generated after manual scoring, include costs, time and subjective bias in analysis without appreciably improving REI calculation. We aim to assess the effect of manual scoring on REI.

## Methodology

We performed a retrospective review of HSTs done from January through October 2017. Data of 244 consecutive patients with a high pre-testing index of suspicion for obstructive sleep apnea (OSA), who completed 2 consecutive nights of testing (488 studies) were included. All records underwent automated analysis followed by visual over scoring. The Apnea Links system™ Air testing system was utilized, which contains an automated algorithm for REI-A analysis. Records were over scored by Registered Sleep Technologists certified by American Board of Sleep Medicine and scoring was confirmed by board certified sleep physicians.

Cross tabulation of REI severity was done to examine the consistency of classifying participants as having OSA from night 1 to 2 after manual editing.

REI cutoffs for OSAS: Normal <5; Mild: 5 ≤ REI < 15; Moderate 15 ≤ REI < 30; Severe ≥ 30.

Comparison of REI-A and REI-M on each night was done using the Wilcoxon signed rank test

## Results

The population analyzed consisted of 154 males (63%) and 90 (37%) females, with an average age and BMI of 48.2 ± 13.9 years and 33.3 ± 8.7 kg/m<sup>2</sup>, respectively.

Mean REI-A and REI-M on night 1 was 11.8 ± 15.3 and 13.6 ± 15.9. On night 2 values were 12.1 ± 15.1 and 13.7 ± 15.3 respectively.

Using Wilcoxon signed rank test there is significant difference in REI after manual editing on both nights (P < 0.001).

13.5% (33) and 14.3% (35) patients received false negative diagnosis of OSAS with auto scoring on night 1 and 2 respectively.

21.3% and 21.6% of studies had a single level change in severity of OSA after manual scoring on night 1 and 2 respectively.

1 | PAIRED\_WILCOX

Paired test applied

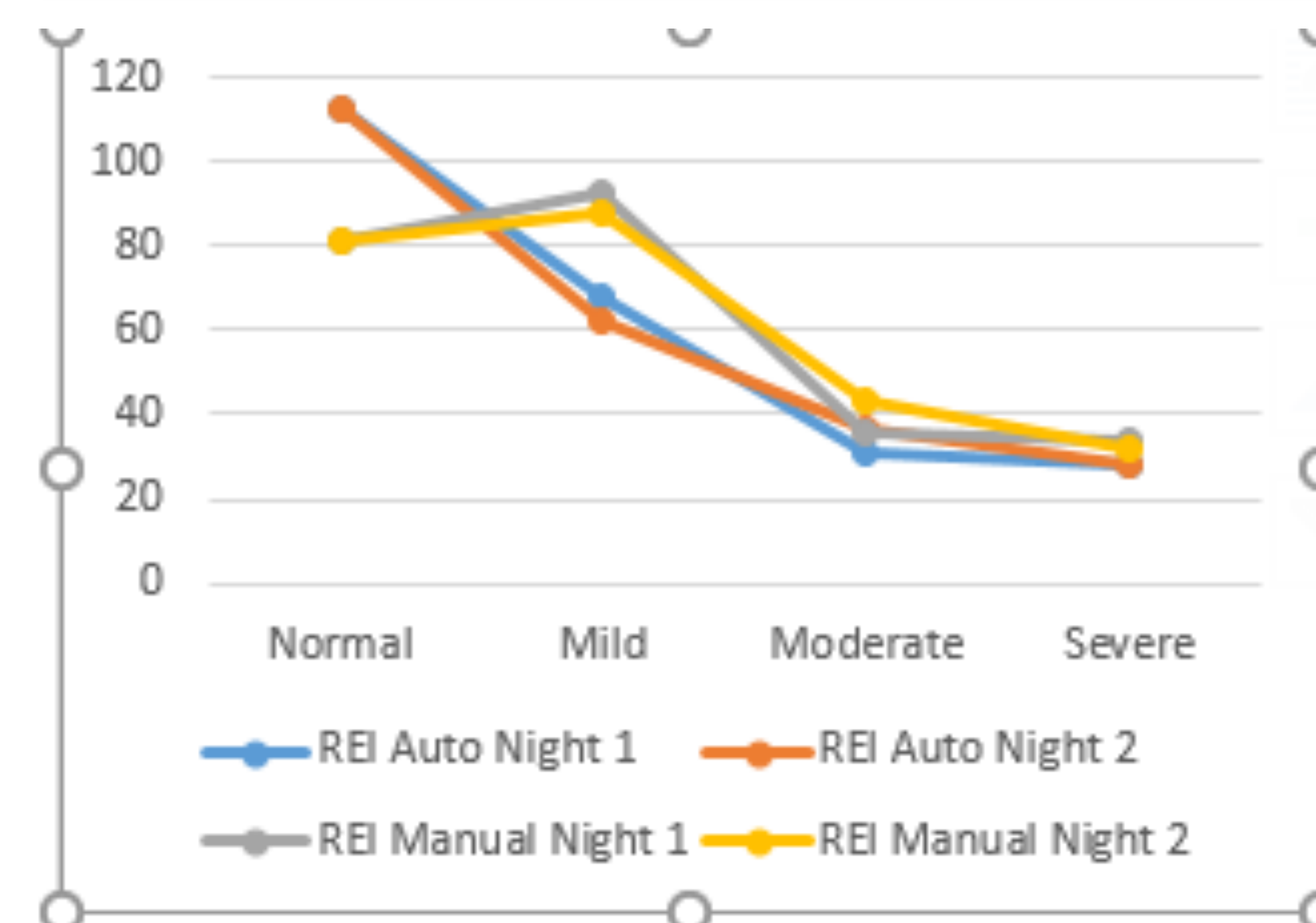
A1M1 p < .001 (Paired Wilcoxon signed rank N\* = 240)

A2M2 p < .001 (Paired Wilcoxon signed rank N\* = 241)

OSAS Severity

	Normal: REI < 5/hr.	Mild: REI ≥ 5, but < 15/hr.	Moderate: REI ≥ 15 but < 30/hr.	Severe: REI ≥ 30 per hour
REI Auto Night 1	113	68	31	28
REI Auto Night 2	113	62	37	28
REI Manual Night 1	81	93	36	34
REI Manual Night 2	81	88	43	32

## Changes in REI classification from night 1 and 2 using auto and manual scoring



## Conclusion

Automated scoring of HST results in false negative diagnosis and underestimates the severity of sleep apnea. We recommend manual scoring over automated analysis in determining REI.

## References

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