



**THE OHIO STATE  
UNIVERSITY**  
COLLEGE OF MEDICINE

**Department of Anesthesiology  
Clinical Research**

# **Advanced Prediction of Respiratory Episode with the Linshom Medical Continuous Predictive Respiratory Sensor**

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# Advanced Prediction of Respiratory Episode with the Linshom Medical Continuous Predictive Respiratory Sensor

## Introduction, Background, and Significance



RDEs are common after surgery

Limitations in Respiratory Monitoring

OR and ICU Technology is not Transferable

RDEs

RR  $\leq 5$  breaths/min for  $\geq 3$  minutes

(SpO<sub>2</sub>)  $\leq 85\%$  for  $\geq 3$  minutes

(EtCO<sub>2</sub>)  $\leq 15$  or  $\geq 60$  mm Hg for  $\geq 3$  minutes

Apnea episode lasting  $> 30$  sec

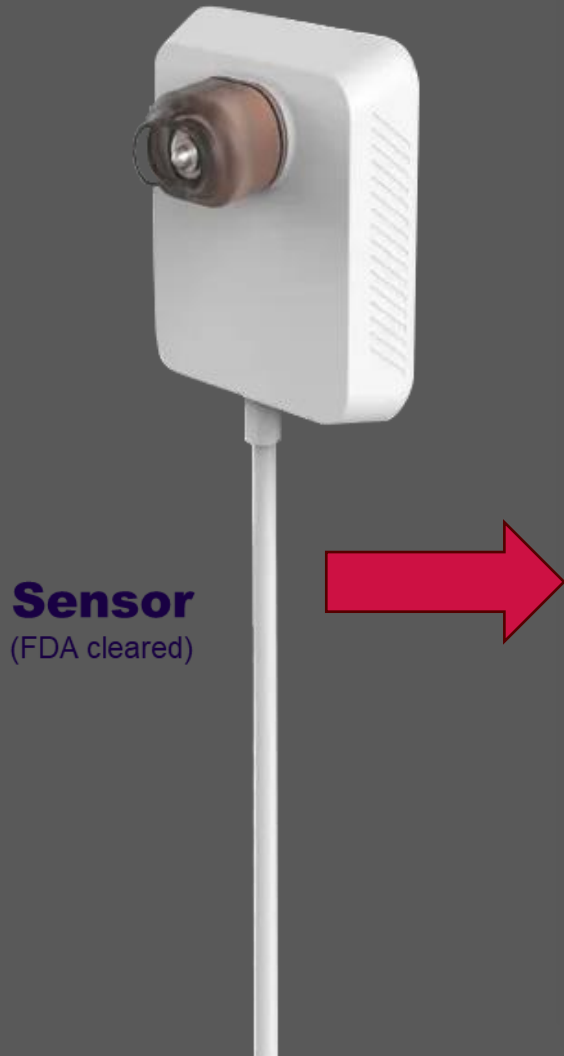


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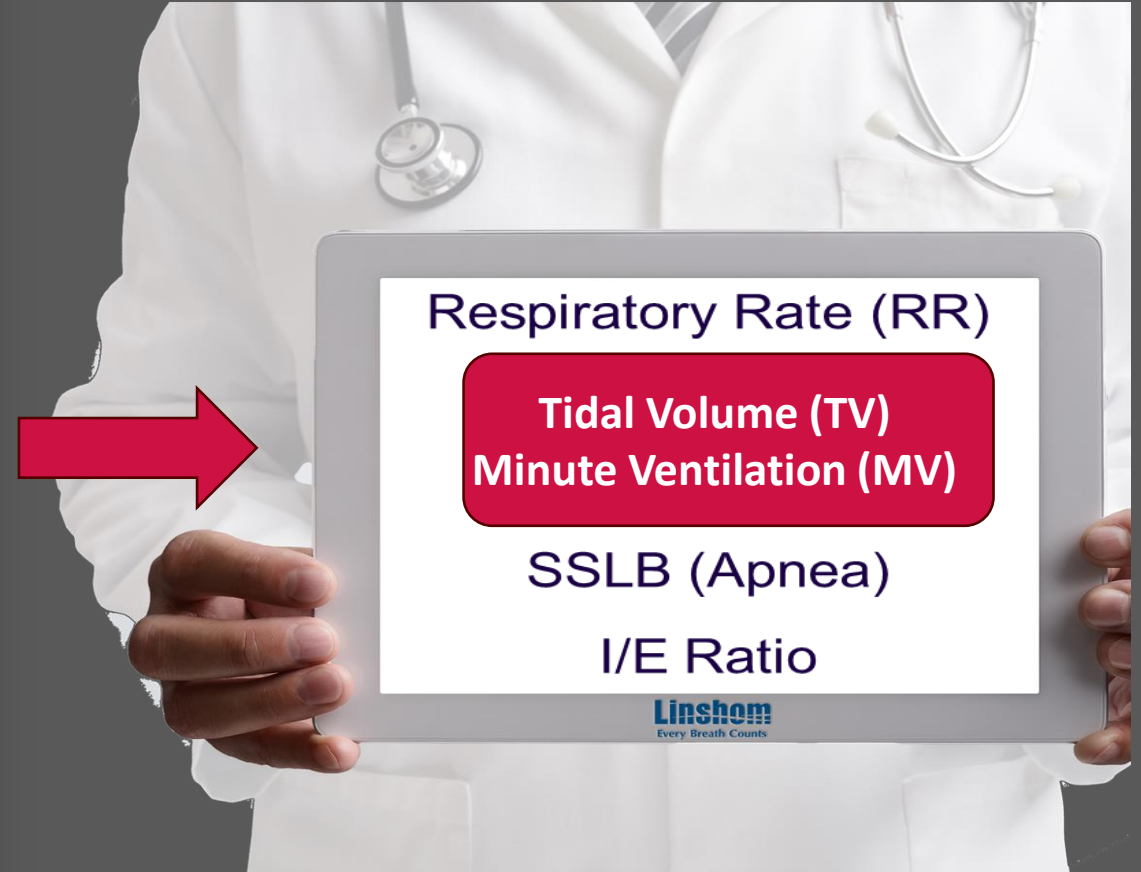
Introduction, Background, and Significance



**Mask**  
(FDA cleared)



**Nasal Cannula**



# Advanced Prediction of Respiratory Episode with the Linshom Medical Continuous Predictive Respiratory Sensor

Methods: Study Design, Study Procedures



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## Study Design

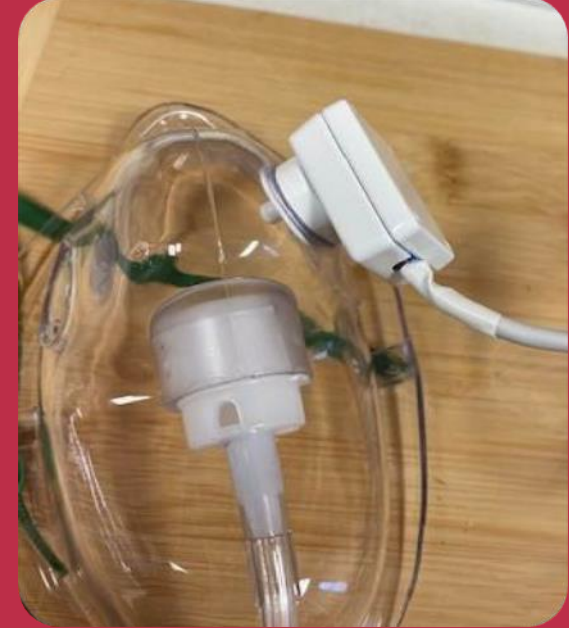
- Prospective, single-cohort observational study with blinded CPRM
- Phase I
- Phase II

## Study Procedures

- Patients undergoing non-cardiac surgery
- Monitored at the PACU for a max of 2 hours
- Linshom Medical sensor on an Oxygen mask
- Capnography via a side stream connected to a Zoe Medical 740 SELECT™ monitor
- Two pulse oximeters on non NIBP arm (SoC and the other for the Zoe Medical monitor)

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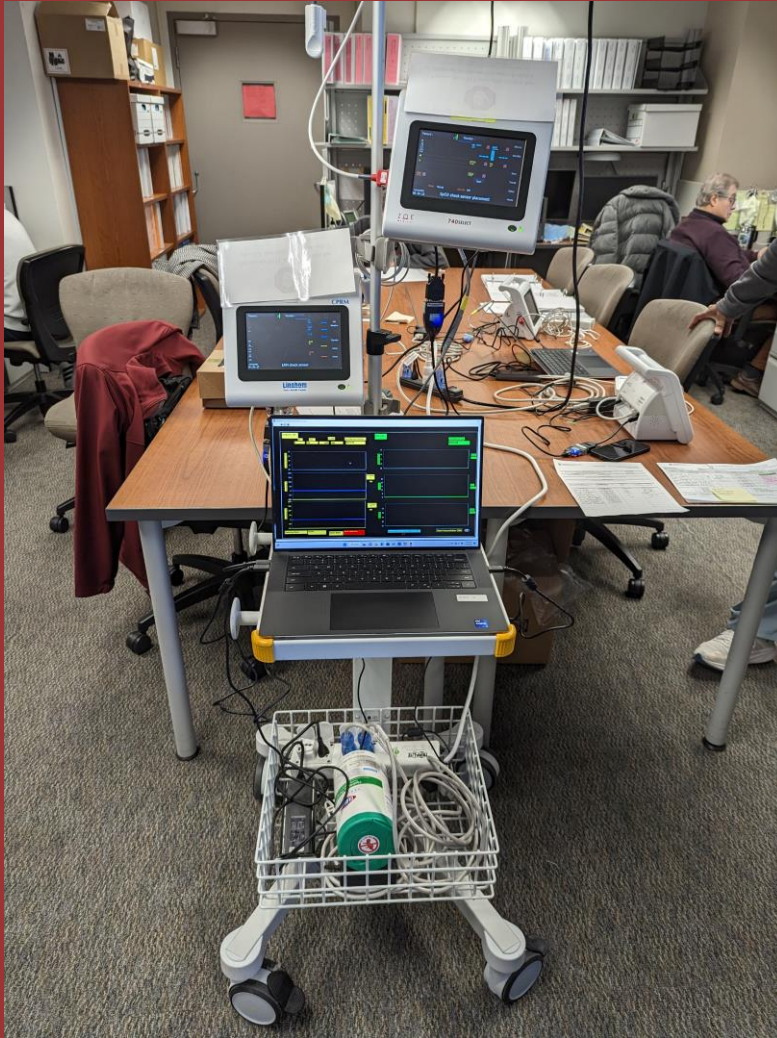
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# Advanced Prediction of Respiratory Episode with the Linshom Medical Continuous Predictive Respiratory Sensor

## Results and Statistical Analysis

Among the 132 RDEs, 110 (83.33%) were detected by Linshom compared to 59 (44.70%) detected by Standard of Care (SOC). Furthermore, 37 (28.03%) were detected by both Linshom and SOC, 73 (55.30%) were detected by Linshom but not SOC, and 22 (16.67%) were detected by SOC and not Linshom (Mcnemar test p-value <0.0001).

		SOC		Total
		Not Detected	Detected	
Linshom	Not Detected	0 (0.0%)	22 (16.67%)	22 (16.67%)
	Detected	73 (55.30%)	37 (28.03%)	110 (83.33%)
	Total	73 (55.30%)	59 (44.70%)	132 (100.0%)

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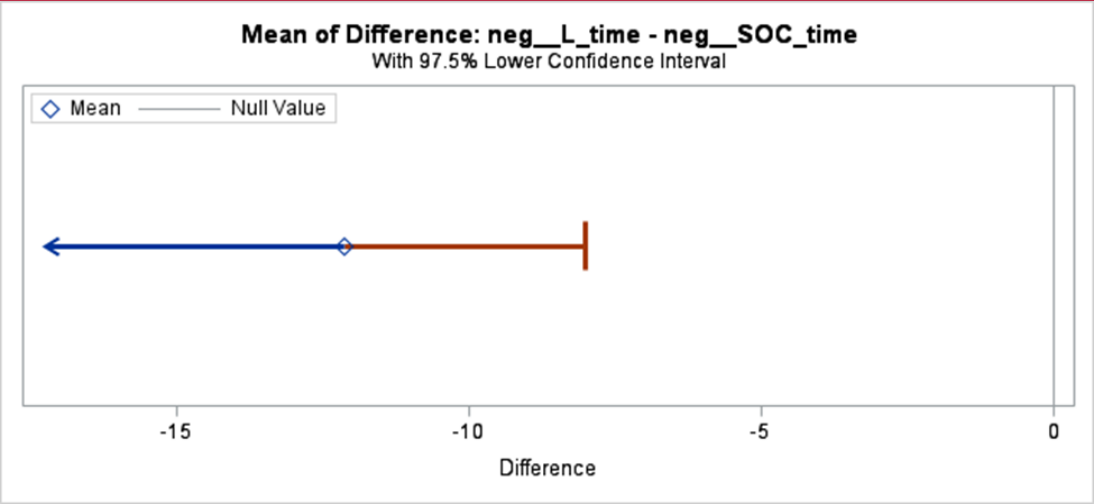
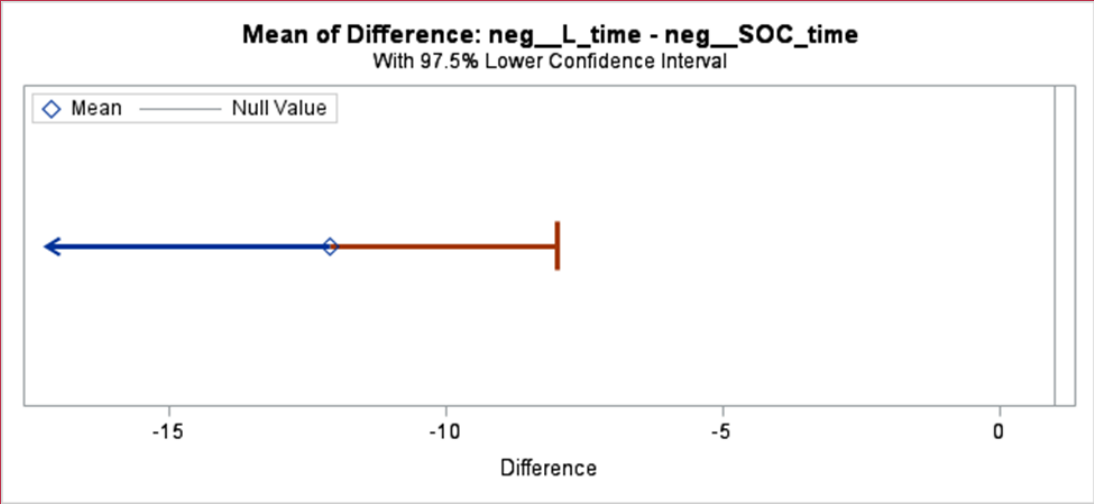
## Results and Statistical Analysis

### Non-Inferiority Test

$H_0: \mu_L - \mu_{SOC} \geq 1.0$   
 $H_a: \mu_L - \mu_{SOC} < 1.0$   
Sign test p-value < 0.0001  
Wilcoxon signed-rank test p-value < 0.0001

### Superiority Test

$H_0: \mu_L - \mu_{SOC} \geq 0$   
 $H_a: \mu_L - \mu_{SOC} < 0$   
Sign test p-value < 0.0001  
Wilcoxon signed-rank test p-value < 0.0001



N	Mean (SD)	97.5% CL Mean		Median	Lower Quartile	Upper Quartile
132	-12.12 (23.93)	-Infinity	-7.99	-30.00	-30.00	4.46



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## Discussion/Conclusions



This research has shown that Linshom Medical's CPRM is comparable to the current standard of care for detecting RDEs and is superior to SoC. The findings suggest that Linshom Medical's CPRM's real-time monitoring of respiratory parameters—such as respiratory rate, minute ventilation, seconds since last breath (SSLB) and relative tidal volume—can enhance patient safety by minimizing the risk of undetected RDEs.



# Thank you!

