

# THE HIGHS AND LOWS OF VENTILATOR ALARMS IN THE ICU

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## INTRODUCTION

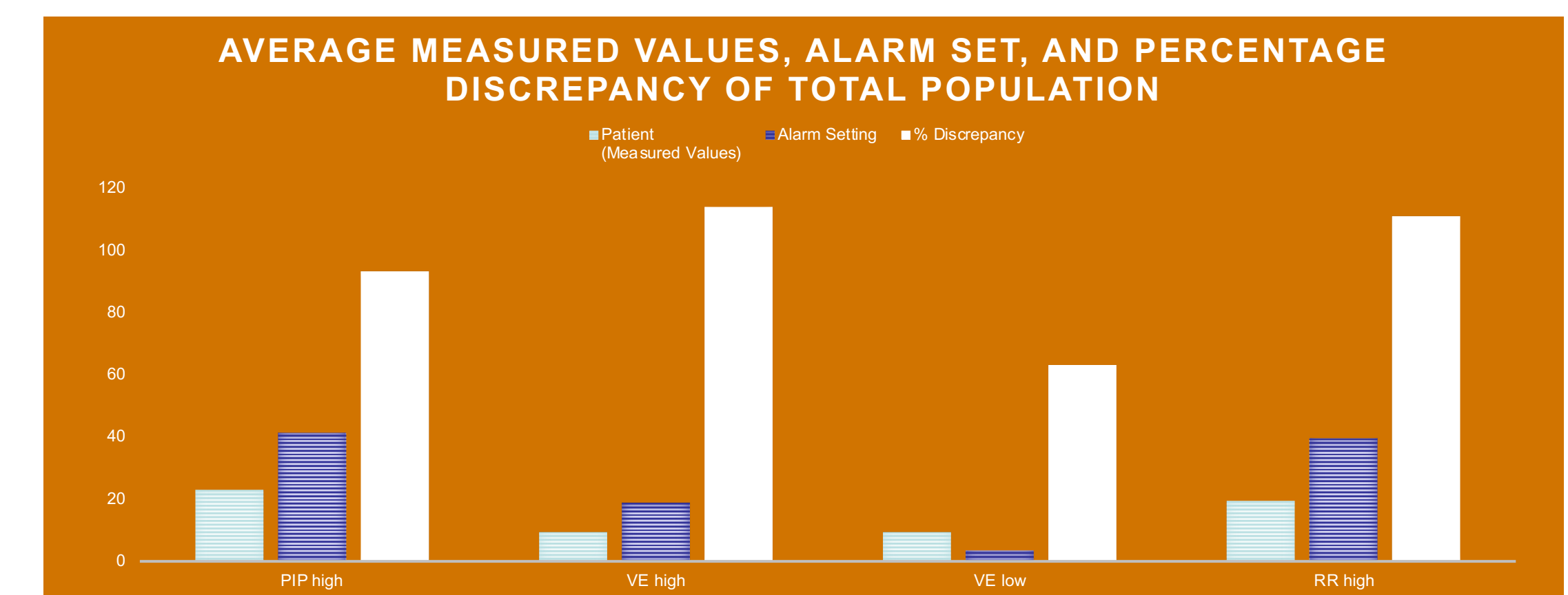
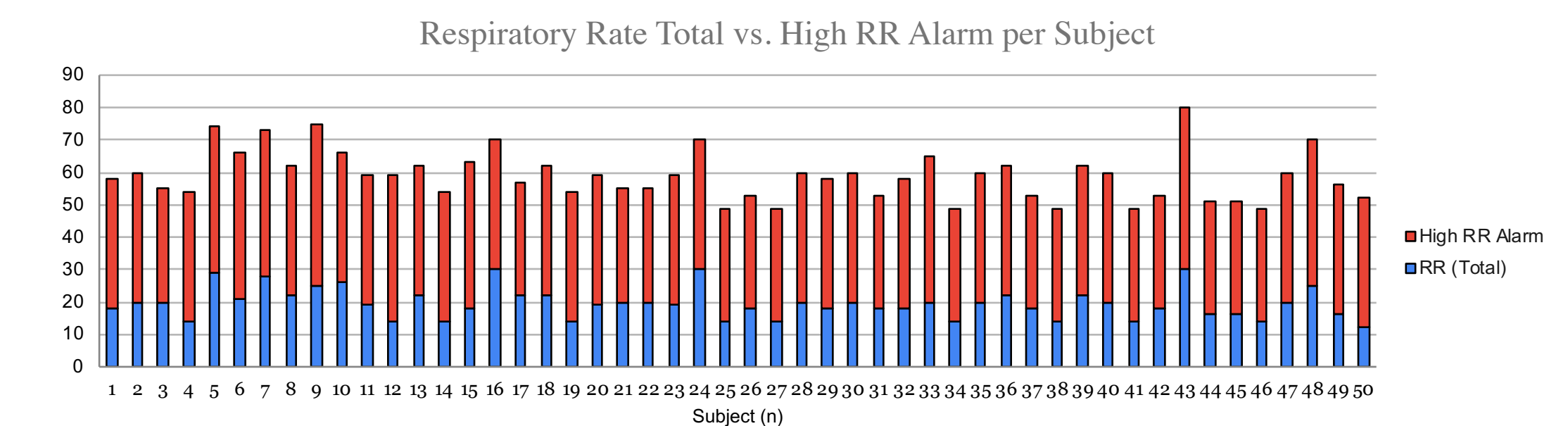
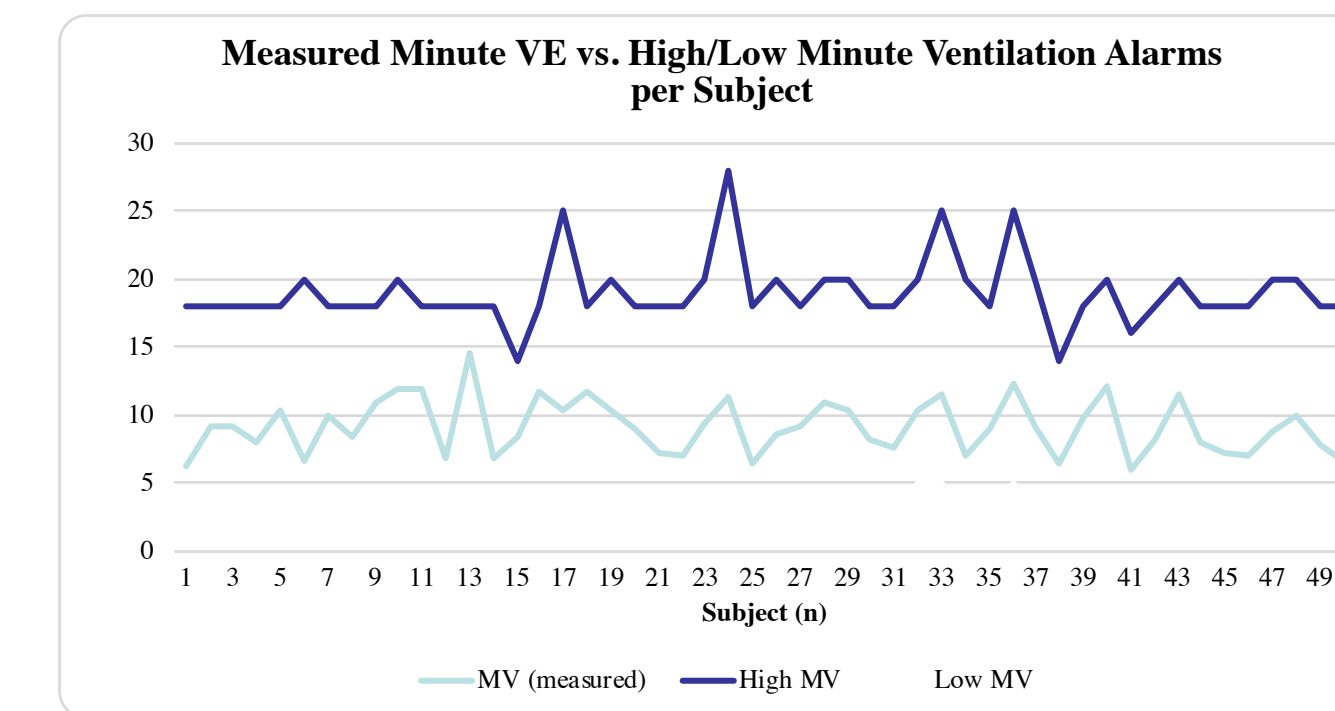
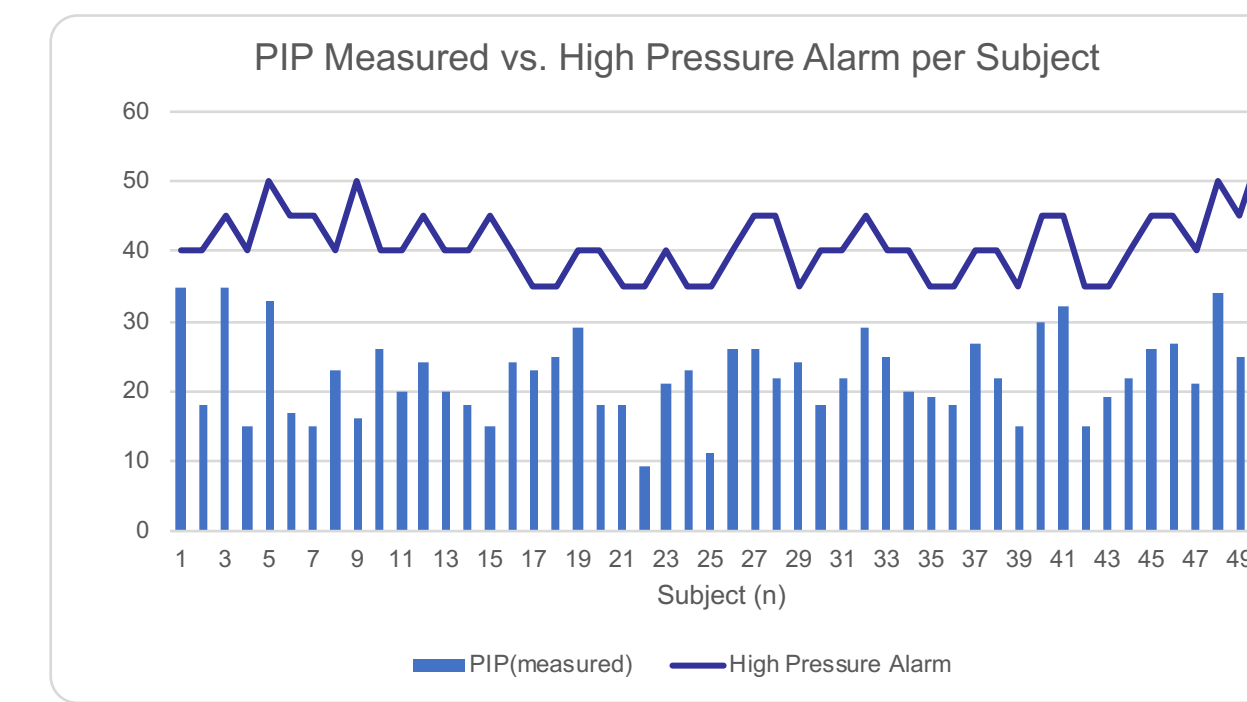
- Ventilator alarms are a critical built-in safety feature designed to detect changes that may require immediate attention to the patient and/or ventilator.
- Alarms are capable of identifying faulty equipment, leakage, patient disconnection, and alert a trained clinician when vital physiological changes such as compliance or airway resistance occur.
- The goal of this study was to evaluate the selection of ventilator alarm settings, determine agreement to current recommendations, and measure percent discrepancy between patients recorded values and the alarm limits selected.

## METHODS

- Retrospective review of electronic medical records (EMR) of subjects admitted to the adult medical ICU and placed on a mechanical ventilator during the month of April 2021 at a Level-1 Trauma Center at in San Antonio, Texas.
- Patient recorded values and alarm parameter selection were obtained for each patient meeting criteria.
- The measured values recorded were peak inspiratory pressure (PIP), respiratory rate (RR), and exhaled minute ventilation (MV).
- The alarm settings selected for analysis were high peak inspiratory pressure (HIPIP), high respiratory rate (HI RR), and high and low minute volume (HI MV, LOW MV).
- IRB approved this study.

## RESULTS

- Data was collected from 50 subjects.
- The mean recorded measured values were: RR 19.54(+/-4.63), PIP 22.70 (+/-6.45), MV 9.18 (+/-2.00).
- Discrepancies between recorded patient parameter and alarm limits ranged ranging from 63% to 114%.
- The mean percentage change between measured PIP and the high-pressure alarm was 93.52 +/- 55.26%;range(14.29%–280.43%); IQR 25-75 (52.59%–117.80%); while between measured total respiratory rate and the high-rate alarm was 110.82 +/-43.67%; range (33.33%–233.33%); IQR25-75 (81.81%–143.75%).
- The difference between mean measured minute ventilation and low minute ventilation alarm was 63.18 +/-8.59 %; range (36.51%–79.45%); IQR25-75 (57.14%–69.62%), and between measured minute ventilation and high minute ventilation alarm was 113.92+/-40.56%; range (23.29%–198.51%); IQR 25-75 (85.83%–145.61%) (Table 1)



## CONCLUSION

The results of this study suggest that ventilator alarm limits in the adult medical ICU were not selected in accordance with current recommendations and appear to be poorly individualized. There is a clear need to review the practice of ventilator alarm selection in the ICU and to evaluate the potential impact of alarm selection on clinical outcomes.