

## BACKGROUND

In the NICU, bedside monitors are crucial for providing care because they:

- Quickly show vital signs at a glance.
- Alert caregivers with alarms.
- Create summaries of vital signs over 12-24 hours, to assess infant wellness and decide on care escalation or de-escalation

## PROBLEMS WITH BEDSIDE MONITORING

- High frequency of alarms (median 50 per patient/day), mostly non-actionable nuisance alarms (75%).
- Unreliable event summaries (apnea, bradycardia, desaturation counts) due to capturing insignificant events.
- Root cause: inaccurate alarm and event capture settings on bedside monitors.

## AIM

To decrease non-actionable yellow alarms in the NICU by 50% within 3 months, achieved by revising bedside monitor alarm and event capture settings.

## CHANGES

FOUR CHANGES IMPLEMENTED:

- Adjusted alarm thresholds and delays for improved sensitivity.
- Refined event capture criteria to focus on clinically significant occurrences.
- Enhanced visual display options to suit infant illness and staff preferences.
- Implemented staff training on interpreting and responding to alarms effectively.

## MEASURES

PROCESS: Median (IQR\*) yellow alarms per patient per day\*\*, Staff satisfaction survey

BALANCING: Monitoring related adverse events such as infant deterioration due to perceived delay in alarms

IMPLEMENTATION: Attendee satisfaction with educational sessions"

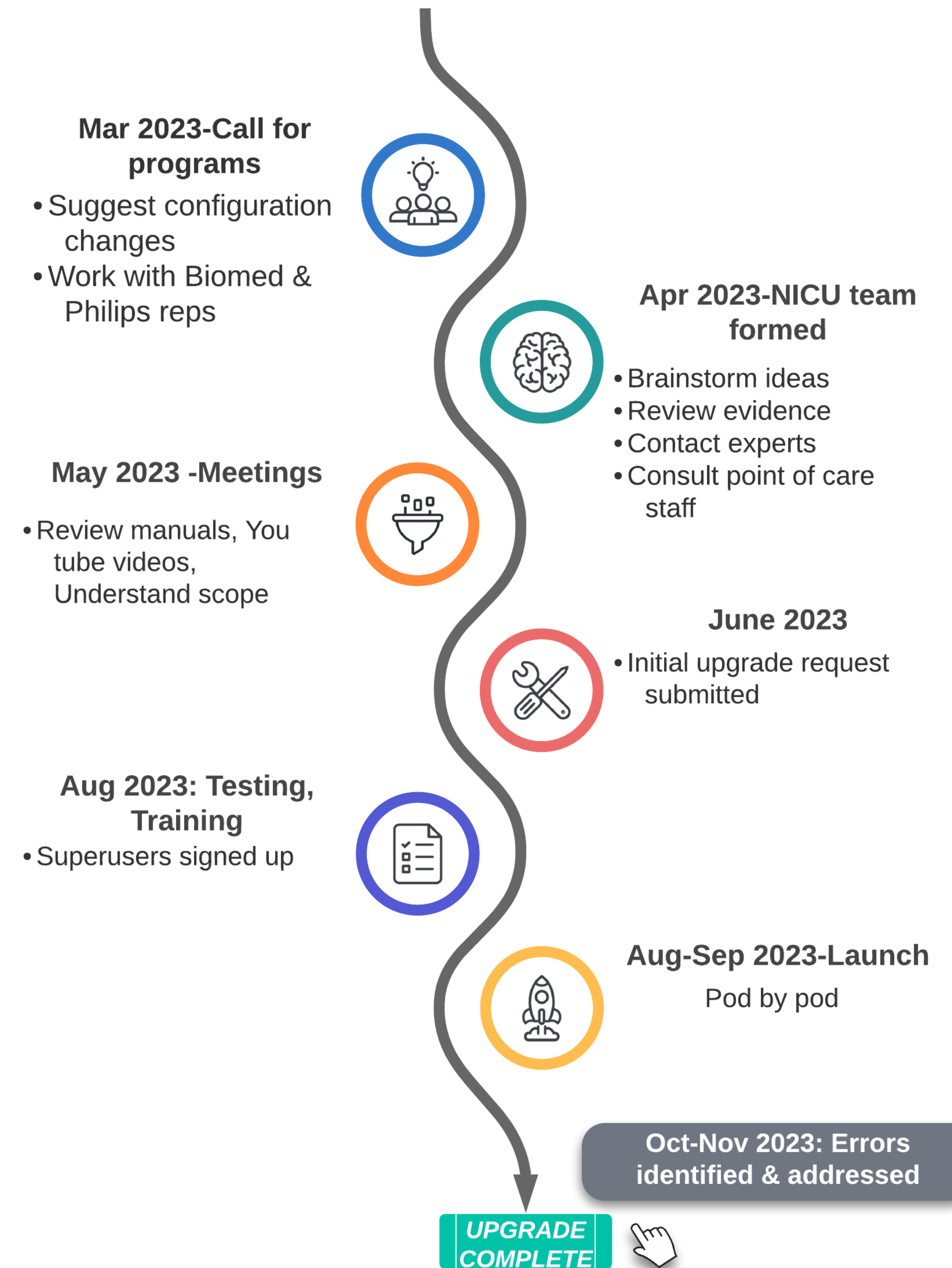
\*Note: IQR stands for Interquartile Range.

\*\*Captured on 100 random patient days from central monitor stations

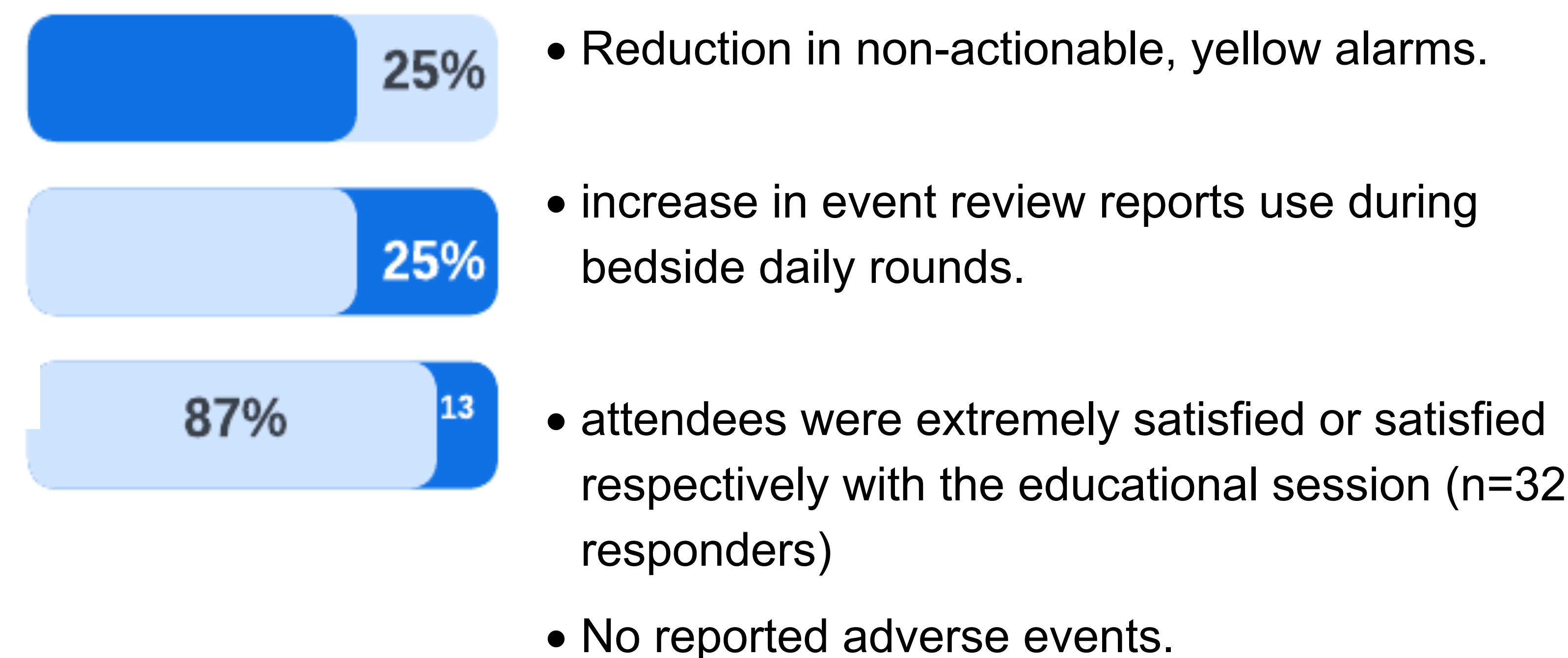
## References

- Neuman Crit Rev Biomed Eng 1984;11(2):77-112  
Fairchild. Pediatr Res. 2019 June ; 85(7): 987-99  
Chandrasekharan J. Perinatol. 2018 January ; 38(1): 86-91  
Shivananda S. Pediatr Qual Saf. 2023 Mar 13;8(2):e639

## PROJECT TIMELINES



## PRELIMINARY RESULTS



## ALARM & EVENT CAPTURE SETTINGS

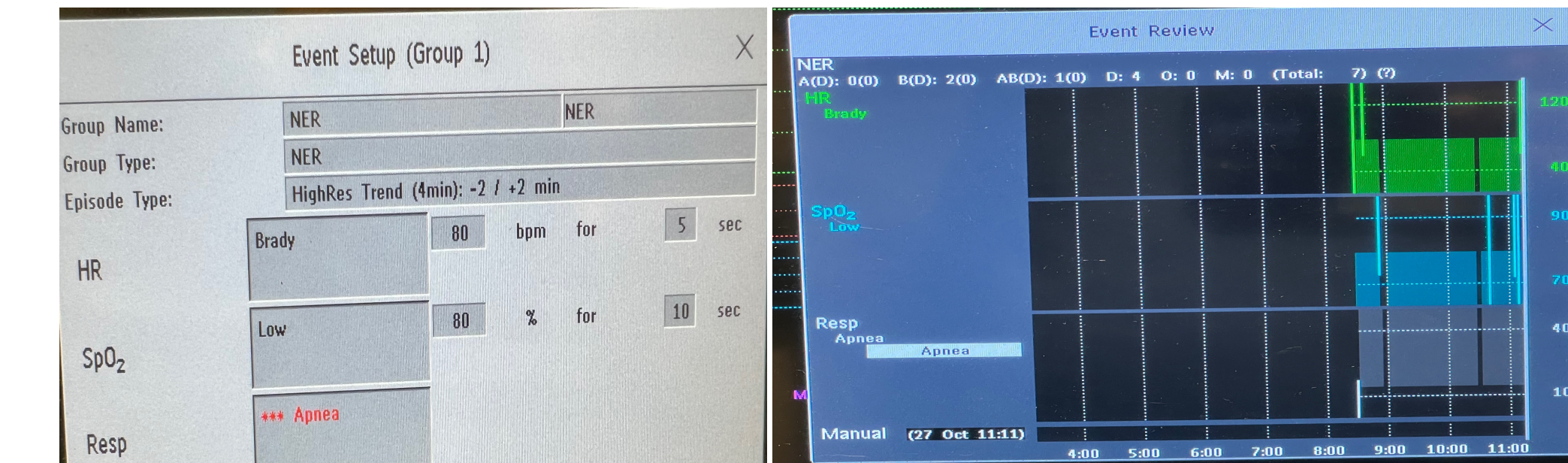
SPO2 SET UP			ECG (HR) SET UP		
STANDARD ALARM DELAY	ON		BRADY CLAMP	BPM	60
SMART ALARM DELAY	OFF		EXTREME BRADY- Δ	- Δ	20
AVERAGING TIME	SECONDS	10	EXTREME TACHY CLAMP	BPM	240
HIGH ALARM DELAY	SECONDS	20	EXTREME TACHY	- Δ	20
LOW ALARM DELAY	SECONDS	20	ASYSTOLE THRESHOLD	SECONDS	3
DESAT DELAY	SECONDS	10	RESP SET UP		
DESAT LIMIT	%	80	APNEA TIME	SECONDS	15
			DETECTION		AUTO

### Trigger rules/configuration set up

When ever monitor detects

- HR ≤ 80 persisting for 5 sec or more
- SpO2 ≤ 80 persisting for 10 sec or more
- RR of 0 persisting for 15 sec or more

Retrigger-only after 2 mins



## VISUAL DISPLAY OPTIONS



## CONCLUSIONS

- Non-actionable nuisance alarms were effectively reduced.
- The reliability of event summary reports was notably increased.

## FUTURE DIRECTIONS

- Revision of central monitoring station configuration for enhanced efficiency.
- Implementation of automated export of event and SpO2 histogram daily reports to electronic health record (CERNER) for seamless integration and accessibility

## ACKNOWLEDGEMENTS

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