# **Enhancing Arrhythmia Diagnosis: A Comparison Between One and Three-Channel ECG Recordings**

Ruhi Mahajan<sup>1</sup>, PhD, Alok Gambhir<sup>2</sup>, MD, PhD, Sameer Adumala<sup>1</sup>

<sup>1</sup>Zywie,Inc., Atlanta, GA, <sup>2</sup>Northside Hospital Cardiovascular Institute,

Atlanta, GA.

### BACKGROUND

• Traditional one-channel ECG is widely used due to its simplicity and ease of deployment. However, this approach presents challenges in accurately diagnosing irregular rhythms and artifacts, leading to missed diagnoses and potentially delayed treatment interventions.



Fig. 1 An example of noisy Lead II ECG recording, suggesting interpretation would be difficult if this were the only channel.

### **METHODS**

- Over a 30-day period, we utilized the ZywieAI algorithm to identify arrhythmia events in ECG recordings from 3,596 patients using traditional three-channel MCT/Event devices. The algorithm flagged a total of 78,910 arrhythmia events.
- Any identified events underwent subsequent verification by CCT and physicians and were classified as Critical or Serious.
- A retrospective analysis was conducted to determine if the identified 57,192 arrhythmia events out of the total events that included arrhythmias such as Atrial Fibrillation (AF), pauses, Ventricular Tachycardia (VT), and heart blocks, could be detected using Lead II alone as a representation of onechannel data.
- The diagnostic yield was compared for the periods of 14 days and 30 days.



## Identification of ~6% more first occurrence of AF, VT, **Pause and Heart Block** rhythms with 3-channel vs. 1-channel.

Identification of ~32% more first occurrence of AF, VT, **Pause and Heart Block** rhythms with 3-channel for 30 days vs. 1-channel for 14 days.





For additional information, please contact at : info@zywie.healthcare o: 877.858.7200

Figure 2 suggests that clinically significant arrhythmias would have been missed if we had only analyzed one-channel ECG monitor data. This indicates a critical limitation of relying solely on single-channel recordings for arrhythmia detection.



Figure 3 illustrates the comparison of critical arrhythmias' first occurrence when using one-channel ECG for 14 days versus three-channel ECG for 30 days. The data reveals a substantial number of arrhythmias that would have been entirely missed with a single-channel device.

- blocks.

### RESULTS

Fig.2 Identification of ~6% additional clinically significant events with 3-channel vs. 1-channel.





#### CONCLUSIONS

This study demonstrates that three-channel ECG recordings for 30-day significantly outperform one-channel recordings from 14-day in detecting and diagnosing various arrhythmias, including AF, sinus pauses, VT, and heart

The use of multiple channels enhances diagnostic accuracy, improves arrhythmia management, and leads to better patient outcomes.