

Detection of infection risk and of immune response to vaccination

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Overview

- Objective: detect inflammation/infection/ vaccination response
- Uniqueness of the algorithms
- Working Principle behind the algorithms
- Results for infection detection
- Results for vaccination response



Uniqueness of the algorithms

- Algorithms which:
- Use **physiological** data via a wearable
- Adapt to every **individual** since humans are individually different
- Adapt in **real-time (every sec, min.)** to variations in time since humans are varying in time
- Work on **moving subjects**



Working Principle

For each component, heart rate is triggered by several Signaling Molecules

1. Basal metabolism



2. Immune system



3. Control Body Temperature



4. Physical Performances



5. Mental Performances (stress, anxiety, ...)



Neurotransmitters and hormones



Serotonin
GABA N
Dopamine
Melatonin H
...



Dopamine
Cytokines H
D2-Cells
IL-10
B and T-cells
...



Estradiol H
Progesterone H
...



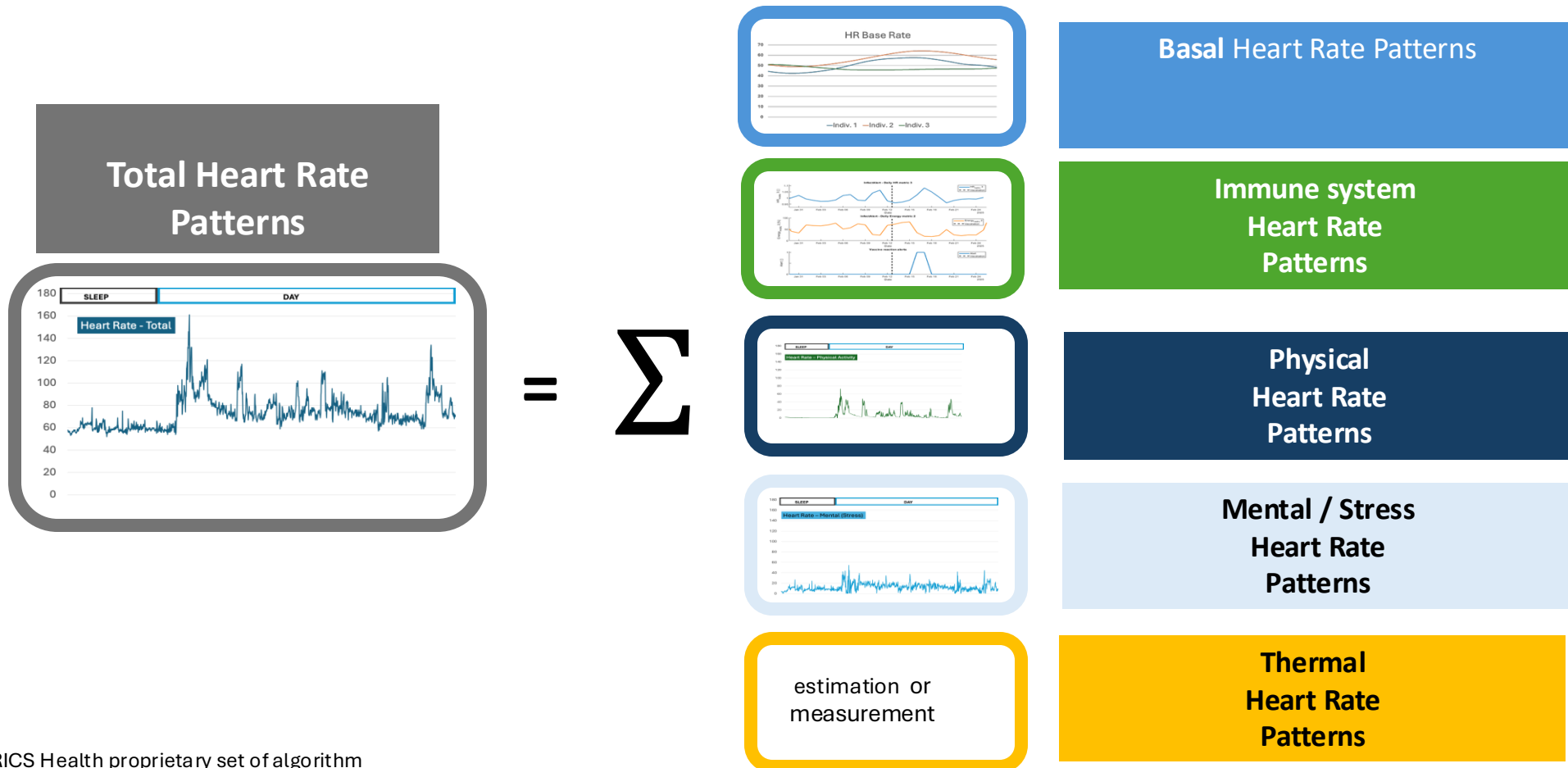
Norepinephrine or
Noradrenalin
Adrenalin
...



Dopamine
Noradrenalin
Cortisol H
Glucagon H
Oxytocin H
Serotonin
...

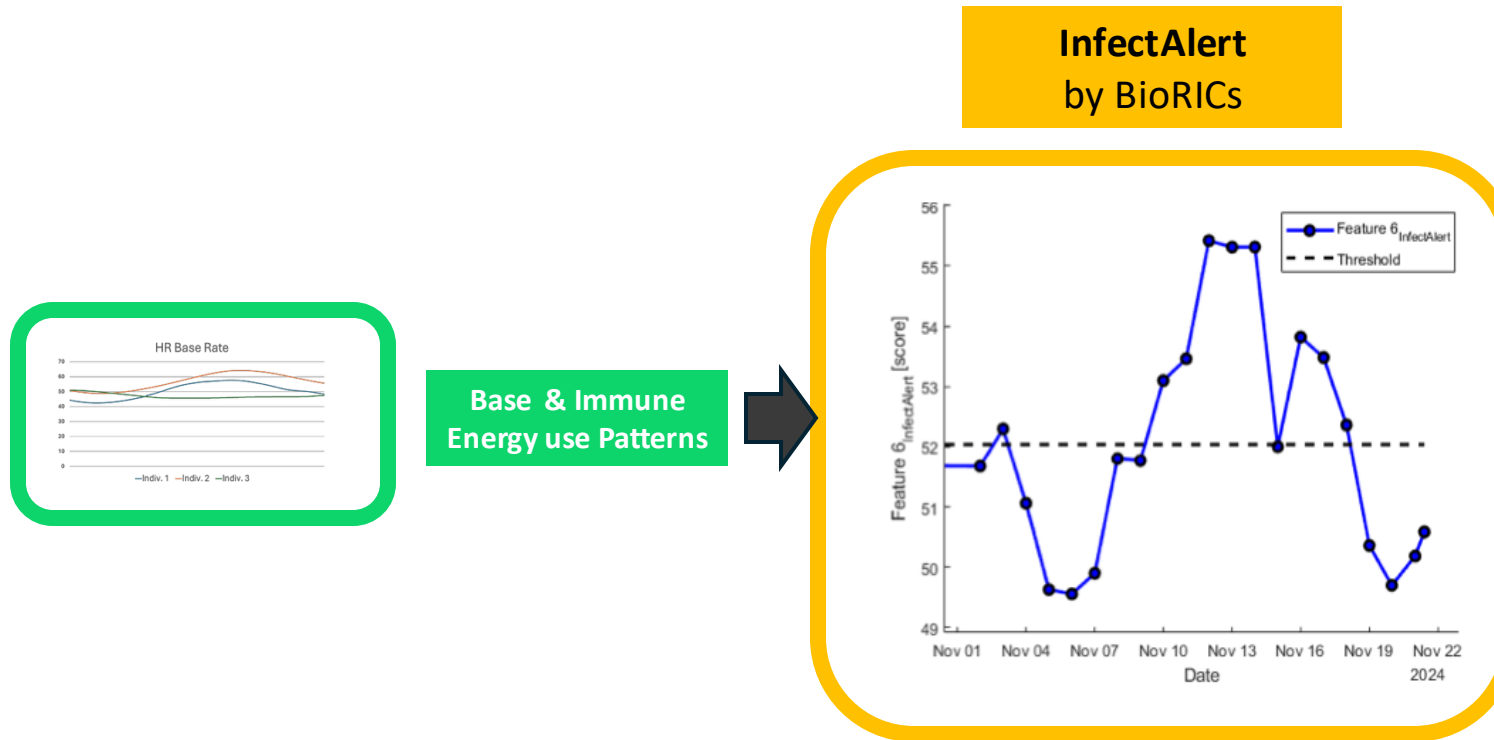
(*Without considering reproduction)

Algorithms decompose individual heart rate patterns using the different dynamics for each body component, combining physiology with mathematics.



References: BioRICS Health proprietary set of algorithm

By monitoring the patient's individual resilience, InfectAlert algorithm detects activation of the immune system during inflammation/infections



Patient-individual Dynamic Pattern Recognition identifies subtle changes in patient heart rate component delivering energy for the immune system, allowing differentiation between physiological and pathological patterns in real time.

Activation of immune system, which happens in every infection **before first symptoms occur**, is detected.

Results: Inflammation/Infection Risk Monitoring

Early detection of infection, on average 4 days before symptoms Data Sets

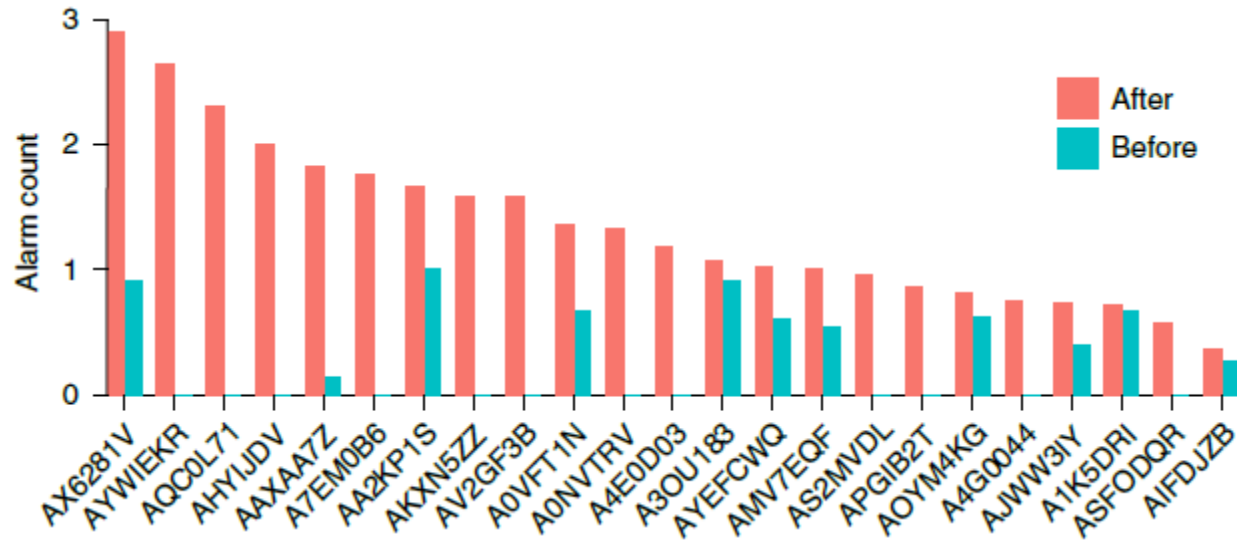
| 4 Datasets from: | N participants | N infections | N Covid infections | No infection |
|---------------------|----------------|--------------|-----------------------|--------------|
| Case study 1 | 36 | 1 | 0 | 35 |
| Case study 2 | 13 | 2 | 1 | 10 |
| Case study 3 | 20 | 16 | 4 | 0 |
| Case study 4 | 120 | 14 | 32 | 74 |
| Total | 189 | 33 | 37 | 119 |

Results

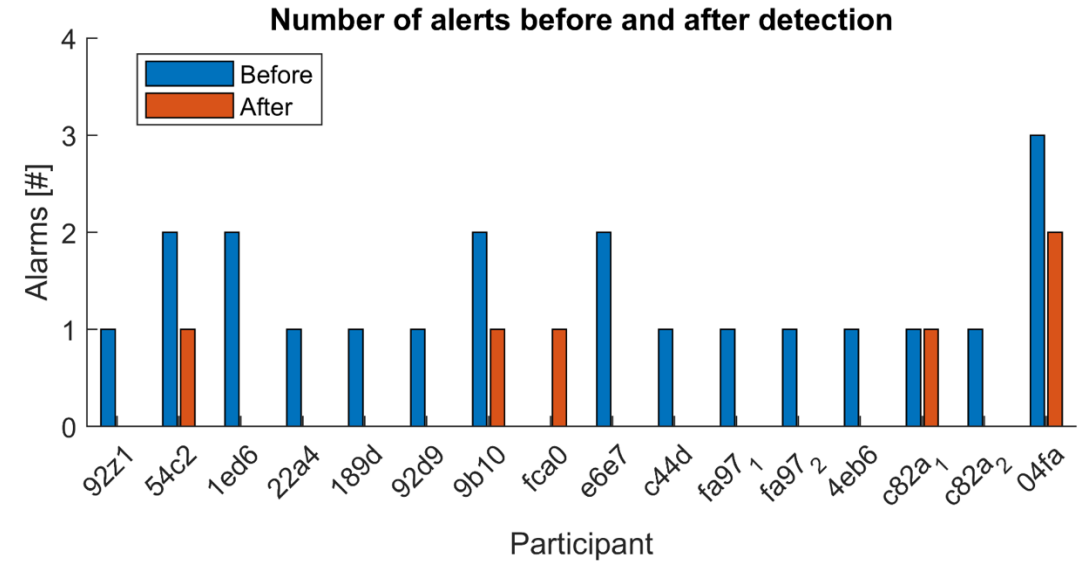
| | Specificity | Sensitivity Covid-19 infections | Sensitivity Non-Covid infections | Sensitivity All | Overall Accuracy |
|---------------------------------|-------------|---------------------------------------|--|--------------------|---------------------|
| Focus on detection | 80% | 75% | 90% | 79% | 80% |
| Reducing false positives | 93% | 71% | 80% | 74% | 85% |

Detection 24/7 is more predictive

Via night resting heart rate (Ref: Stanford)

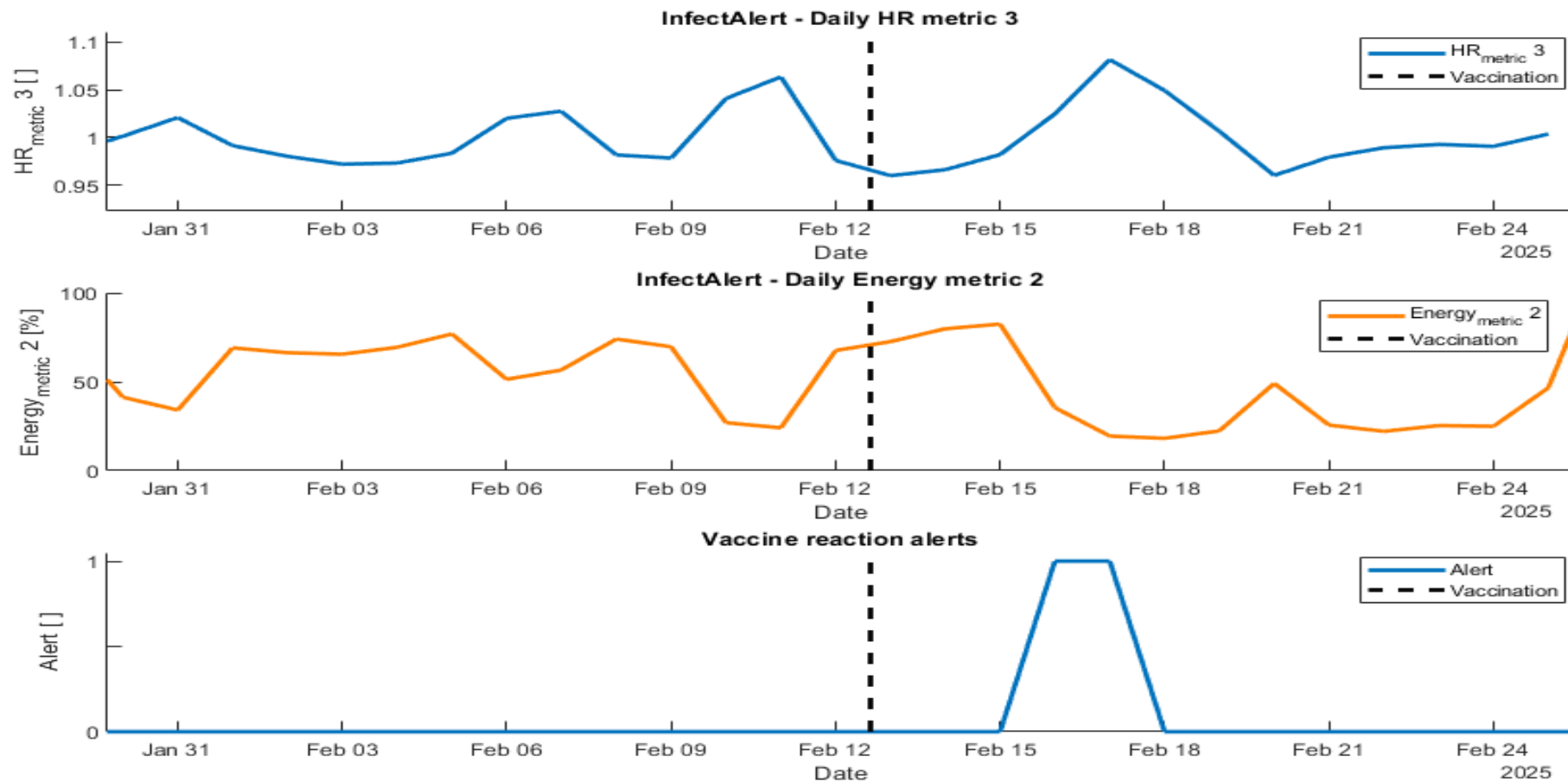


Via metabolic 24/7 energy balance

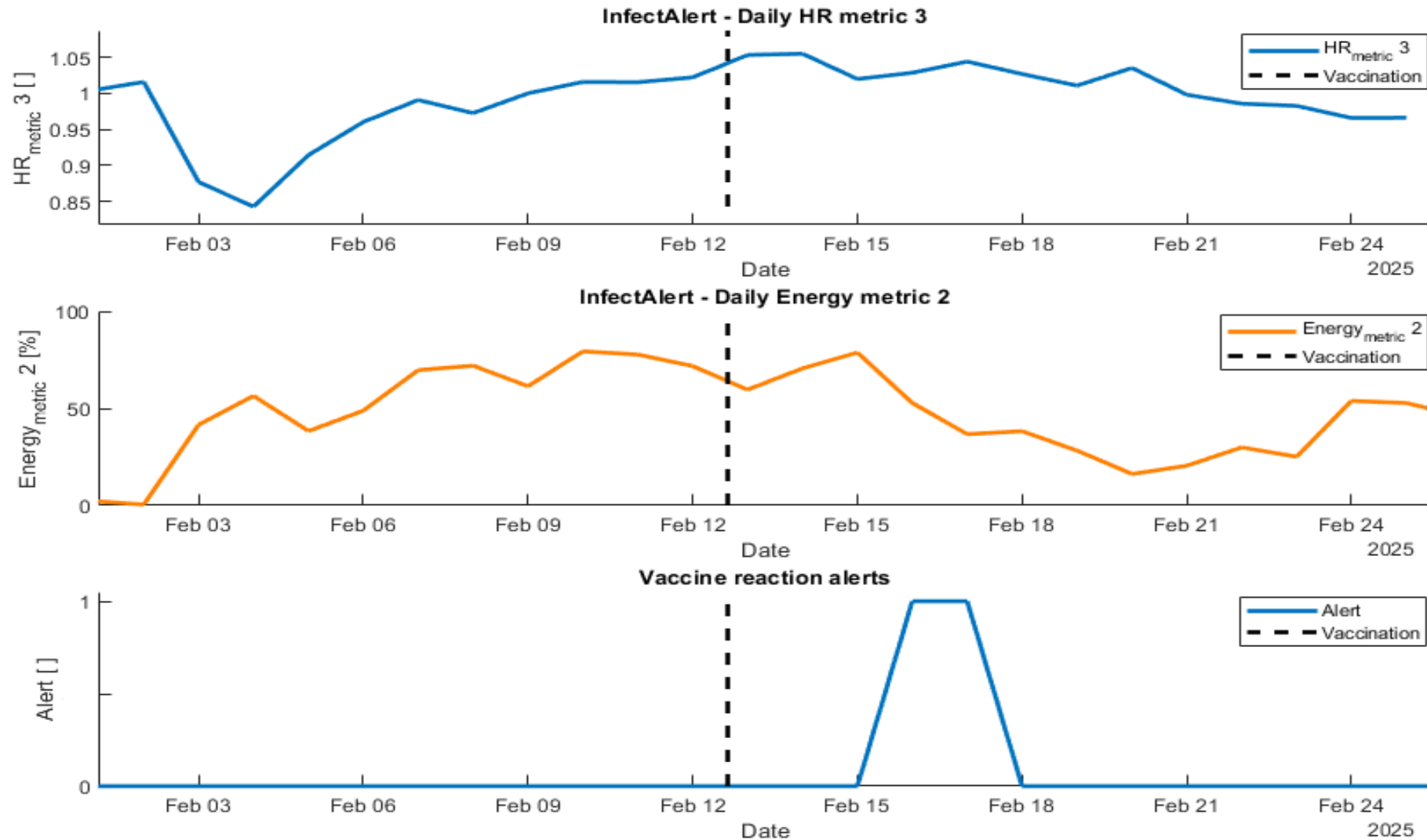


Results: Vaccination response detection

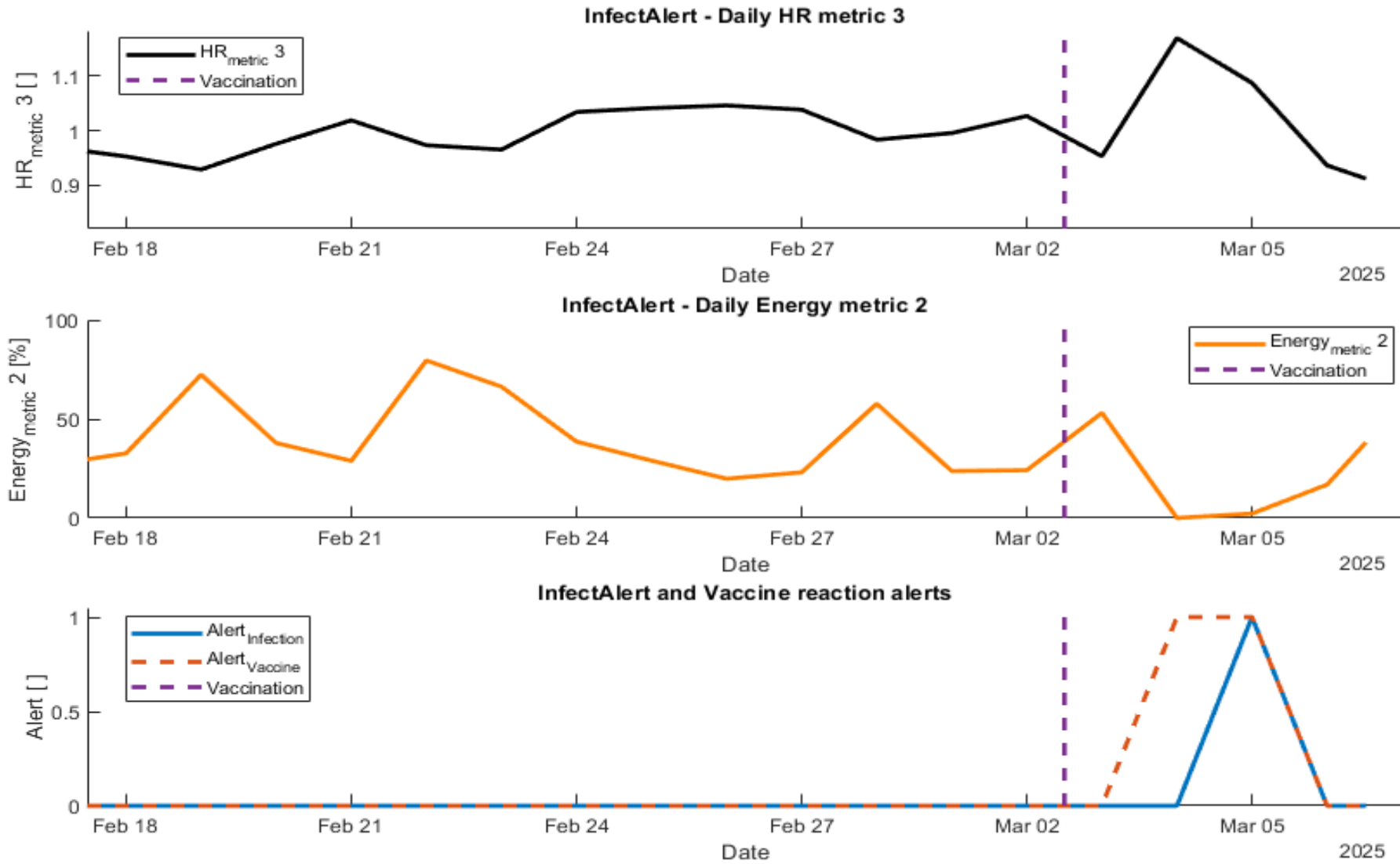
Vaccination response to PREVNAR 13 HT1313 after 3 days Subject 1



Vaccination response to PREVNAR 13 HT1313 after 3 days Subject 2



Vaccination response to booster same day (memory cell) subject 3



Thank you!

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